TECHNOLOGY DEPT.

Gas Journal

Vol. 266. 103rd Year. LONDON, JUNE 20, 1951. No. 4594. Price 1/-
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DETROIT

"We live in a planning World—today has vanished almost completely in our enormous pre-occupation with tomorrow"

H. G. WELLS

An Artist's impression of Gas Production in the not too distant future, incorporating all the By-Product Recovery Plant in one working unit.

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- CAN BE SUPPLIED DRIVEN BY STEAM, GAS ENGINE OR ELECTRIC MOTOR

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Royal Festival Hall Kitchen

A general view of the all-gas kitchen which will cater for 1800 people at three sittings. Cooking apparatus was manufactured by Benham; the company also planned and installed the kitchen.

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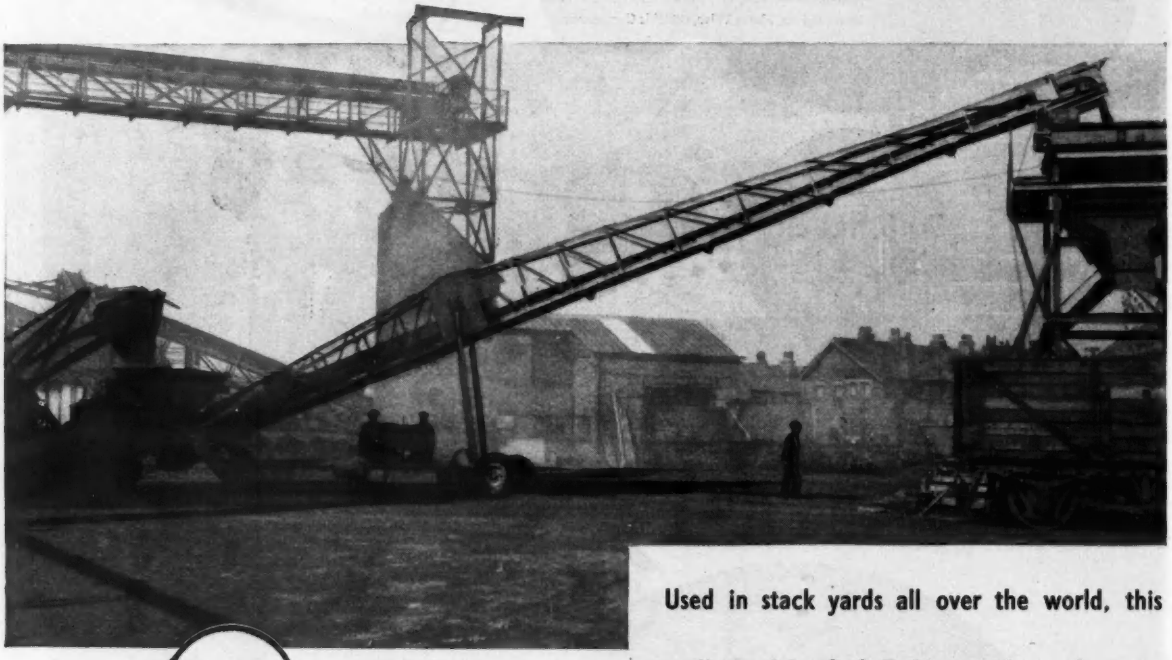

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Used in stack yards all over the world, this really mobile C & T Mammoth stacker can stack coal, coke and other loose materials with only one man operating the mechanical shovel. Note extra large feed hopper for speedy tipping. Mammoth stackers have been towed 200 miles in 12 hours.

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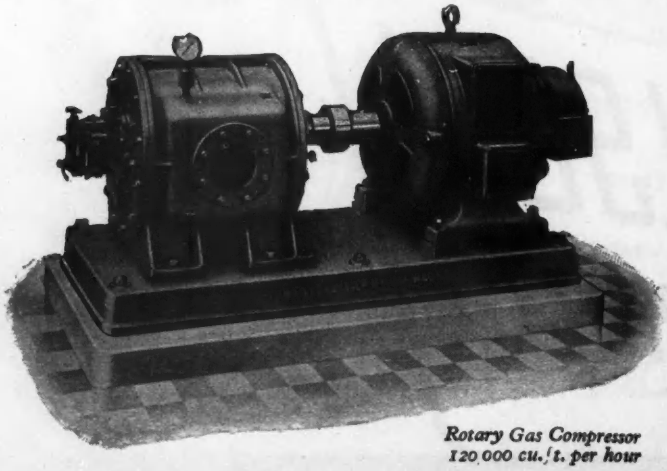
We have supplied numbers of Steam Turbine and Motor Driven Exhausters for Coke Oven Plants; Steam Turbine, Motor and Gas Engine Driven Gas Boosters and Rotary Compressors for Transmission and Distribution Purposes; Portable Compressor Units for Breaking up Roadways with Pneumatic Picks for Laying Gas Mains, and for Caulking and testing Pipe Lines; and Turbo Blowers for Water Gas Plants. If you send us particulars of your requirements we will quote you for suitable plant.



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120,000 cu. ft. per hour

Write to Dept. "J" for illustrated pamphlets, giving full particulars of our manufactures.

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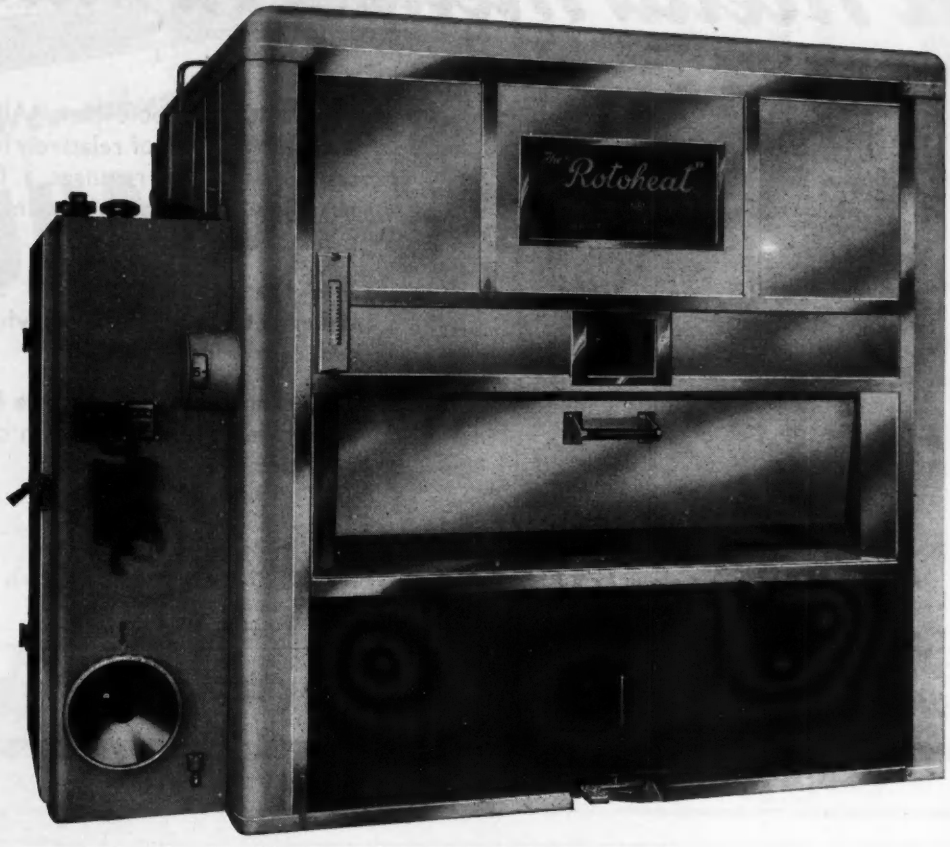

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No skill required to operate—easy control of temperature.

Variable baking time; only 3 ft. to 4 ft. required in front of oven to operate; thermostatically controlled.

Made in three sizes—there is one to suit every trade.

Will bake to perfection.

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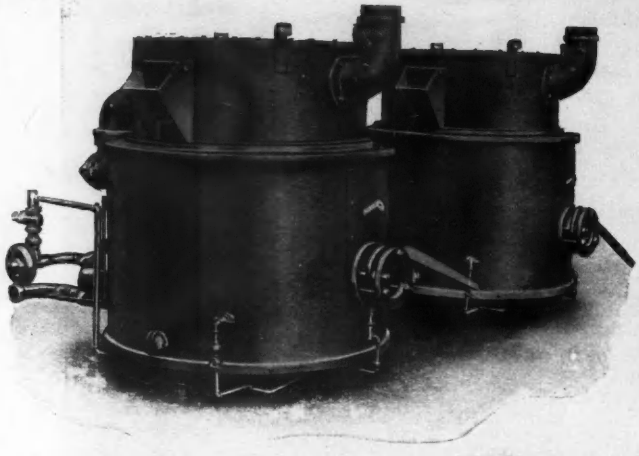

The melting of Soft Metal Alloy is essentially one of relatively low temperature but requires a fast heat input to obtain maximum production.

This heating must be well distributed to avoid hot spots which reduce pot life.

This problem of heat balance has been carefully worked out in our Soft Metal Melting Furnaces.

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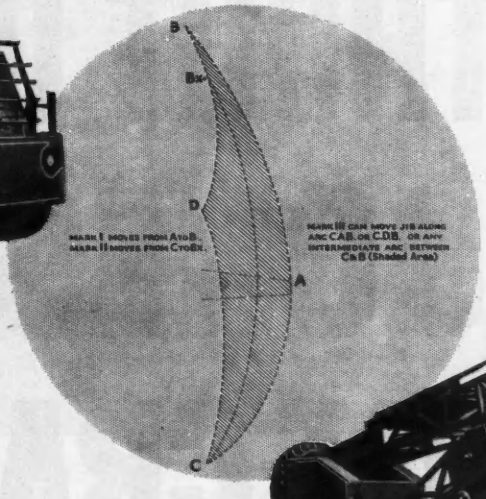
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MARK I MOVES FROM AtoB.
MARK II MOVES FROM CtoDx.
MARK III CAN MOVE JIB ALONG ARC CAB, OR CDB, OR ANY INTERMEDIATE ARC BETWEEN CaB (Shaded Area)

Left: Both jibs fully extended. Maximum lift position.
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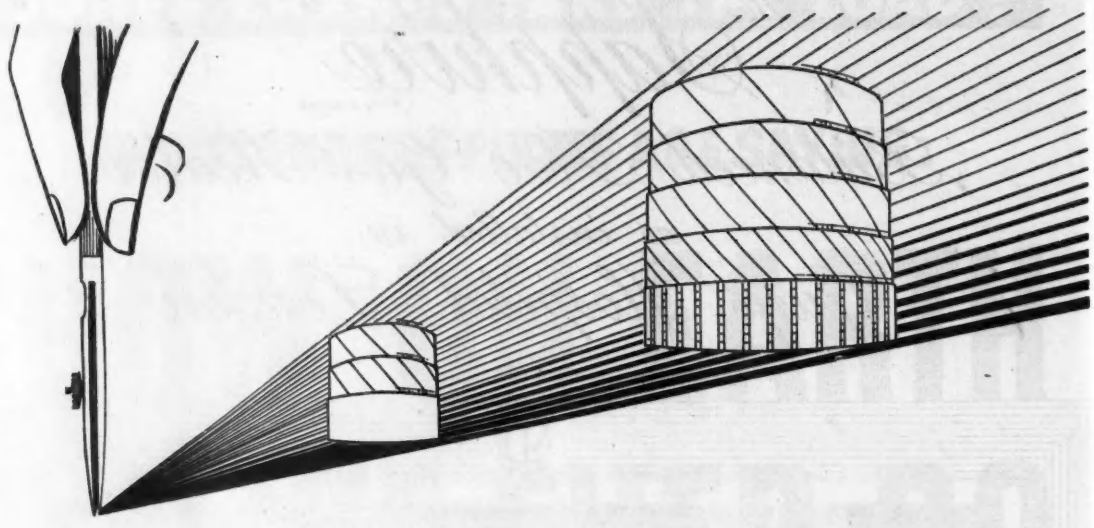

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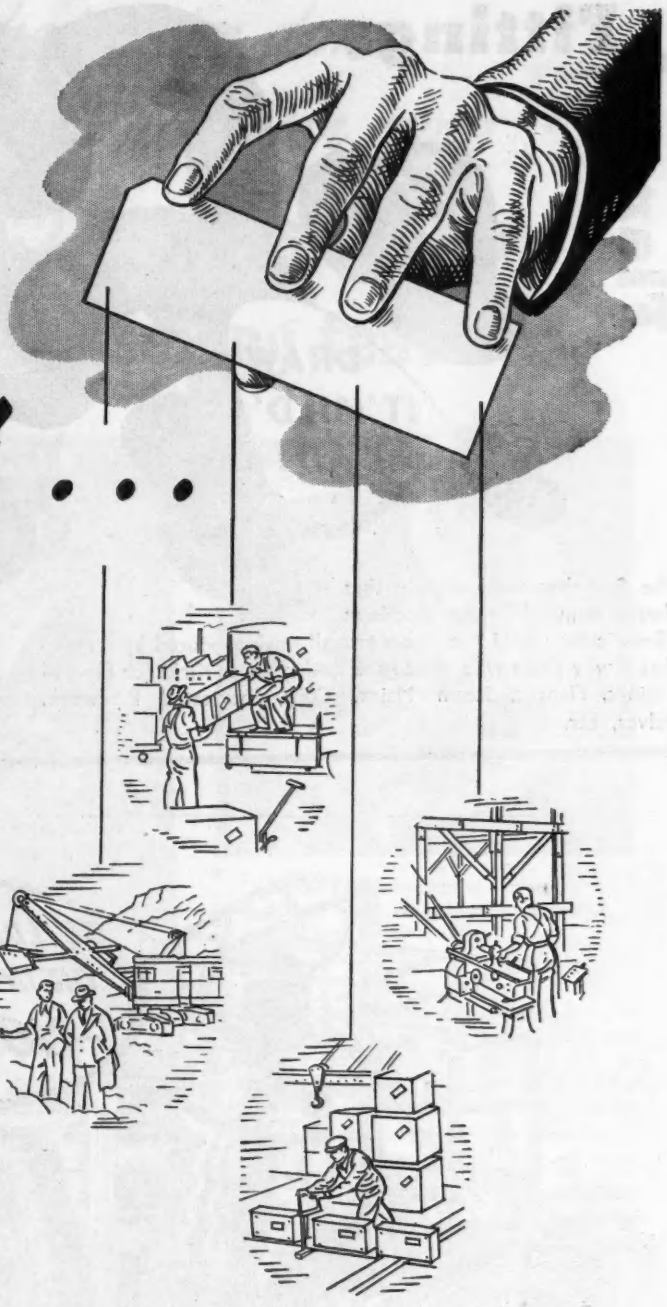
Complete and flexible CONTROL . . .



Business and administrative control should be complete and flexible with the ability to achieve continuous review and rapid adjustment—like the hand controlling the marionettes. The Powers-Samas punched card system gives you this ability. Whether you wish to review a business transaction, a manufacturing operation, costing element or factory activity, punched cards will give the current picture at once, analysed and interpreted for you. This means—among other advantages—that loads can be adjusted, overlapping avoided, costing kept under constant review and any losing operation disclosed immediately.

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"As you see, there are no nuts or bolts to bother with . . . the hotplate lifts up, can be turned right round and dropped back in position."

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"The other big advantage of this cooker is that these trivets lift out easily and can be dropped back in *any* position."

BY ALWAYS keeping ahead in gas-appliance design, General Gas make sure that their products — for efficient, labour-saving service as well as smart, modern good looks — are always ahead in public favour. This announcement is another instance of leadership in design that is sure to mean leadership in sales.

All these features, too, make it a fast seller

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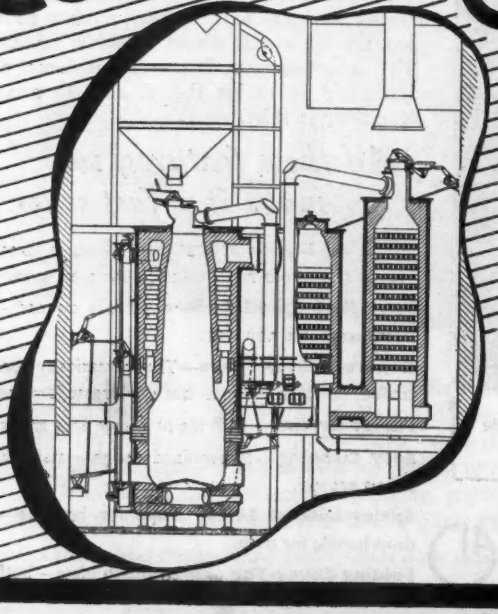

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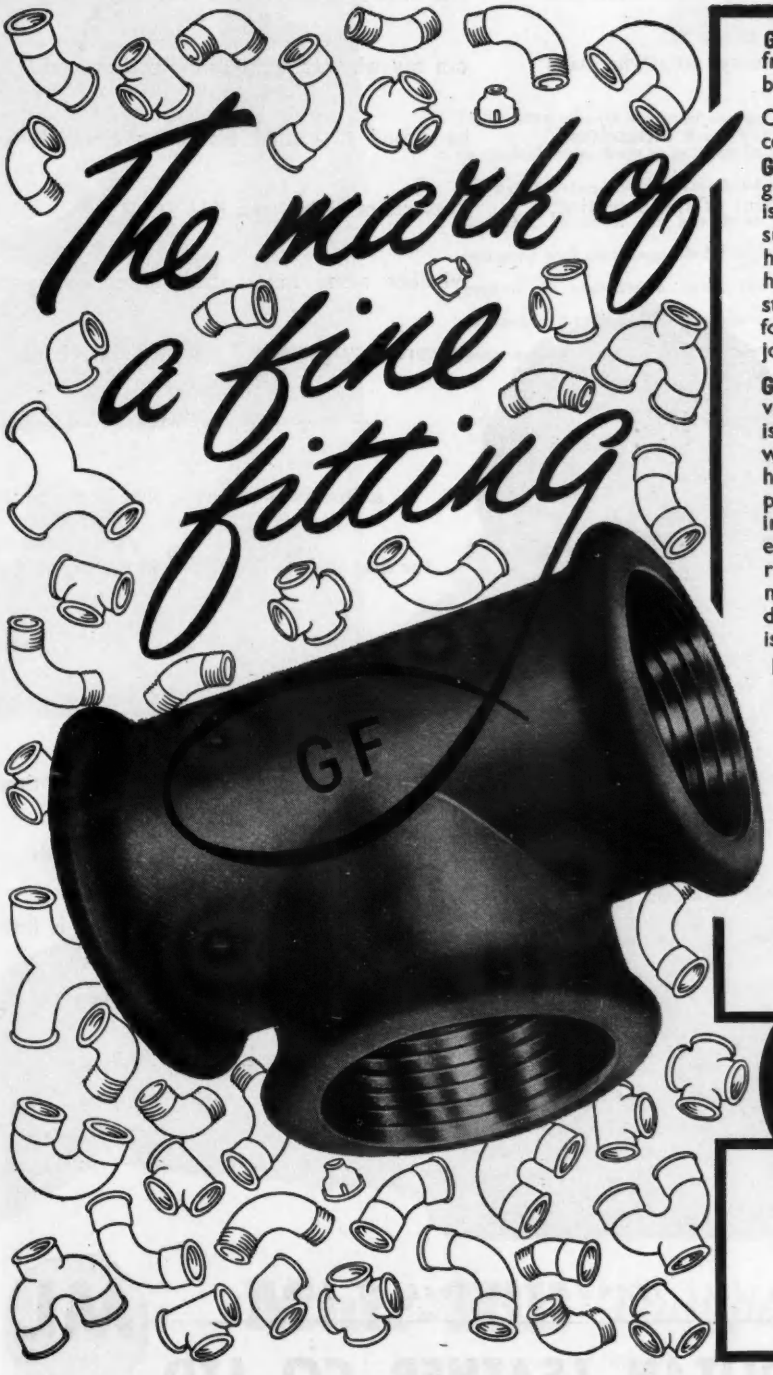

GF Fittings are supplied from stock either in black or galvanised.

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The quality of a GF Fitting is remembered long after its cost is forgotten.

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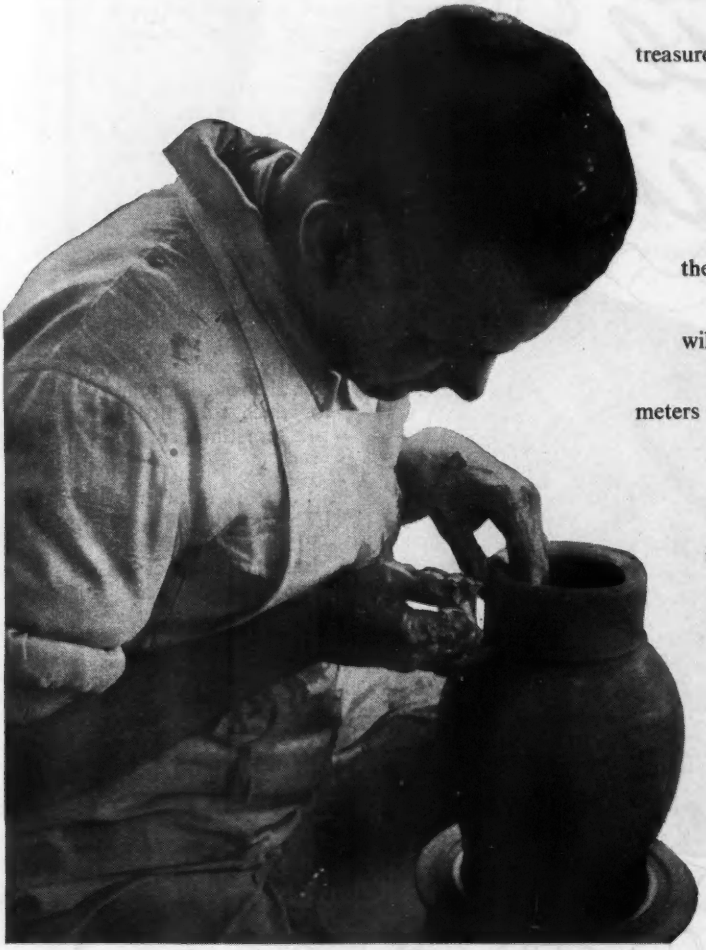

The contemporary potter is a true craftsman. His work is quality and will endure. And who can say whether some future collector will not be proud to exhibit his pieces alongside the treasures of SUNG and K'ANG HSI?

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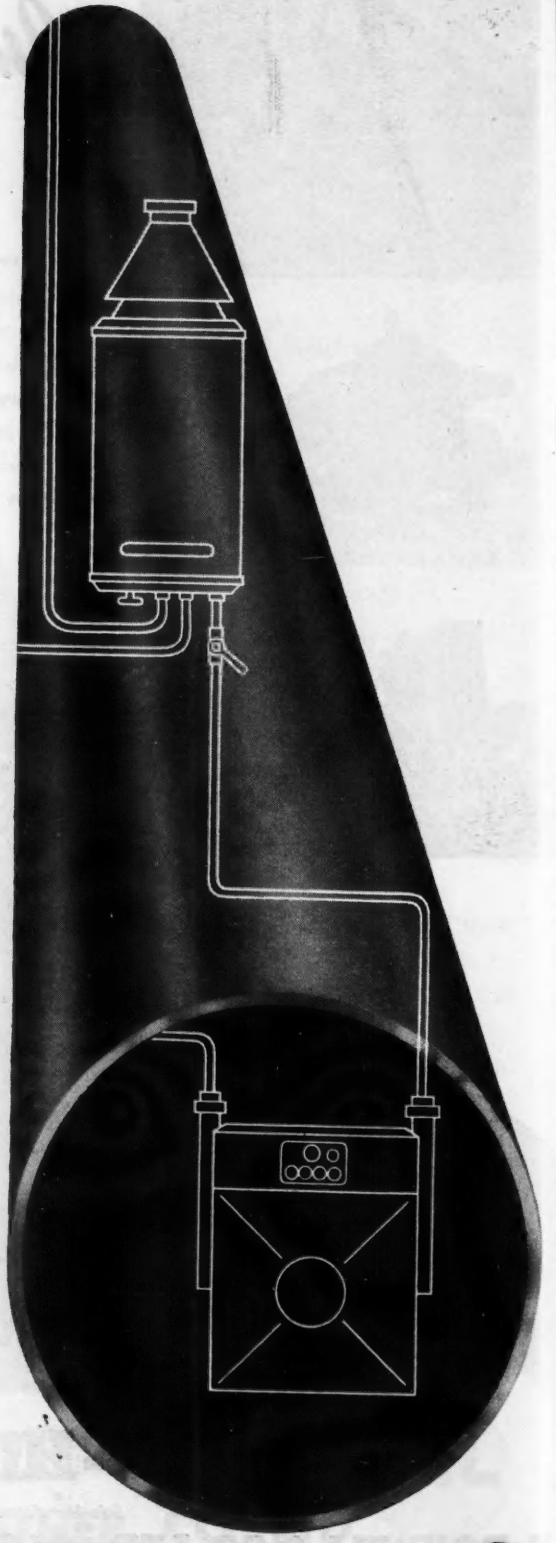
Whatever the building—farmhouse or factory; house, hotel or hospital—the job is better done with I.C.I. copper tubes.



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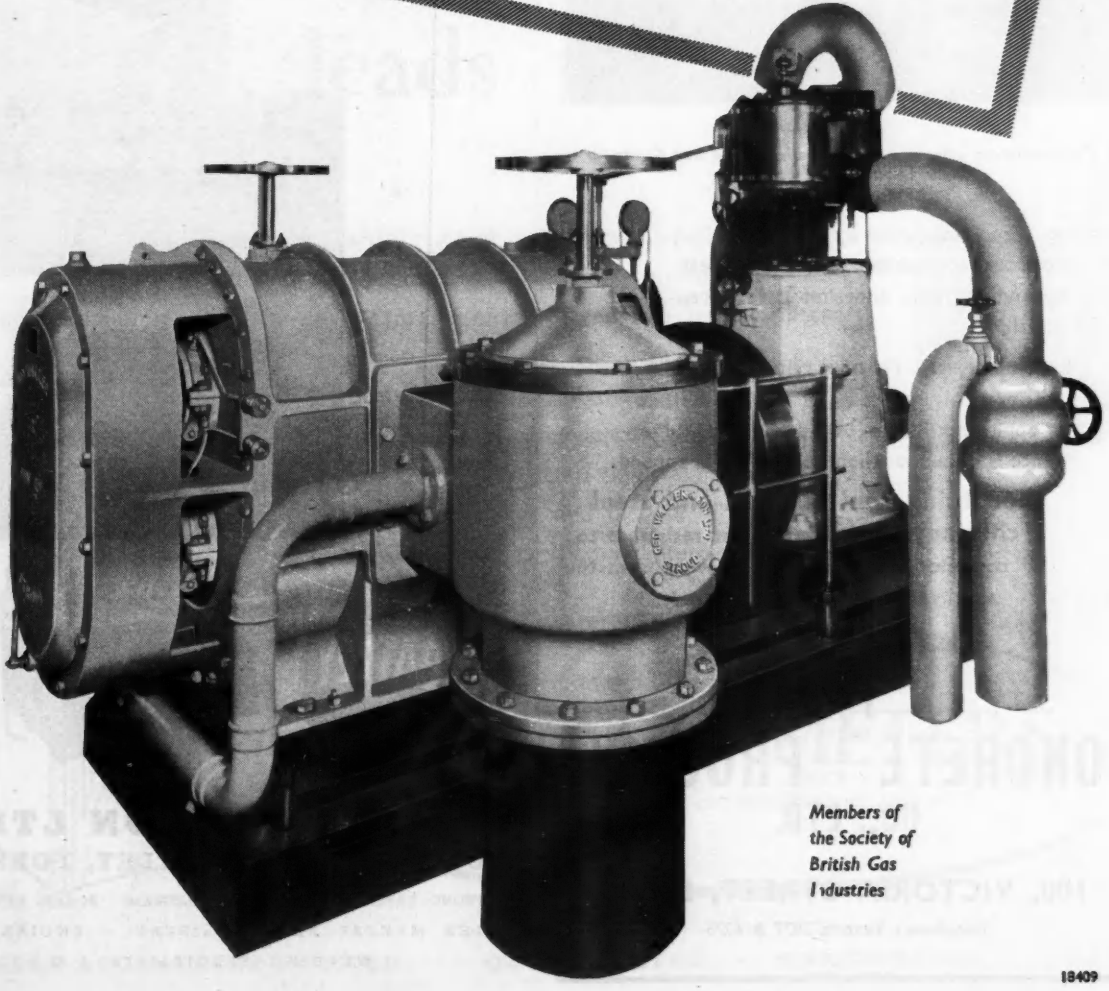

Members of the Society of British Gas Industries

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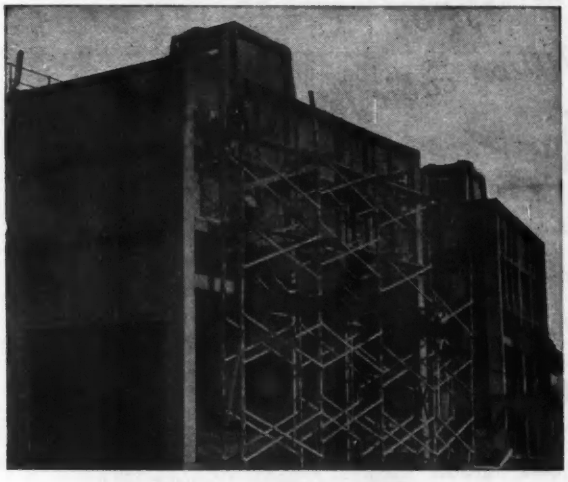

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For repairing reinforced concrete it has particular merit, as, due to the method of application, a uniform density and adherence is obtained whenever Gunite is applied.

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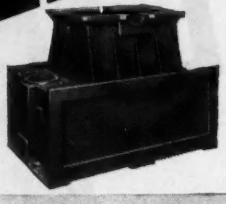

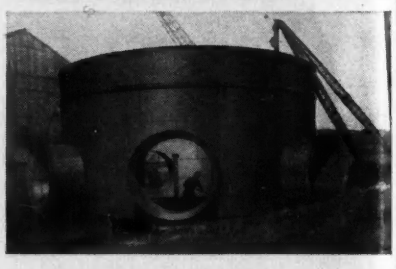

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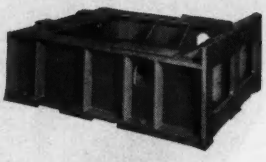

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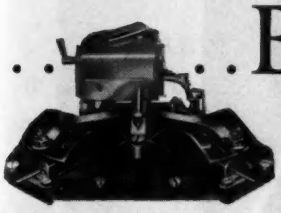

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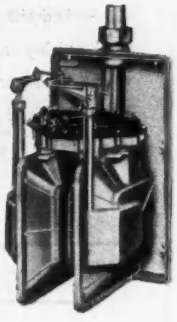

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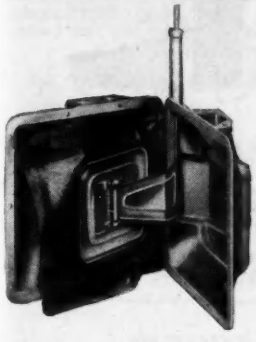

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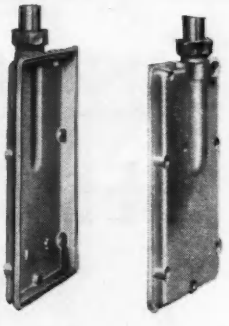

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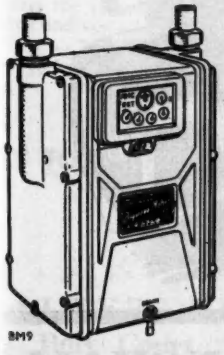

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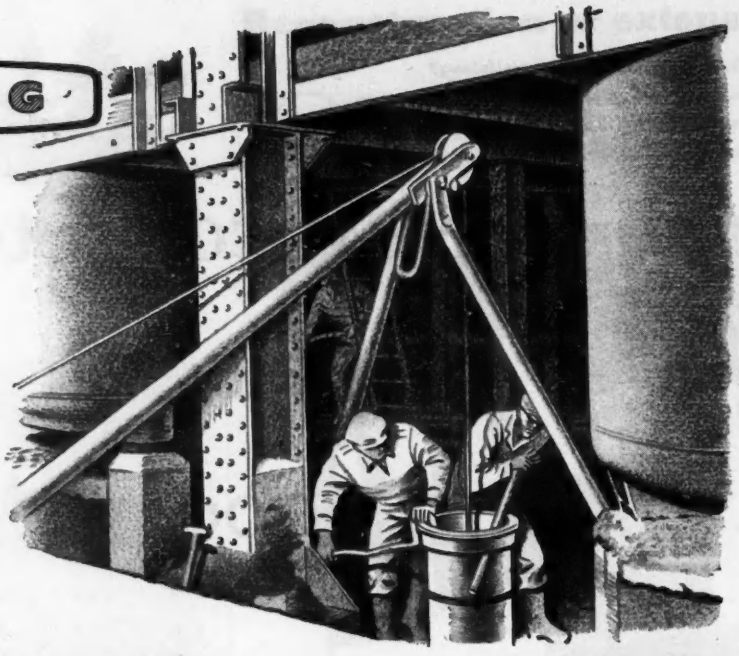

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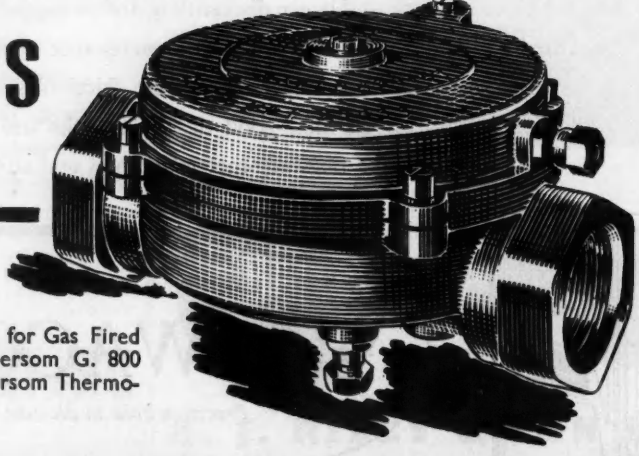

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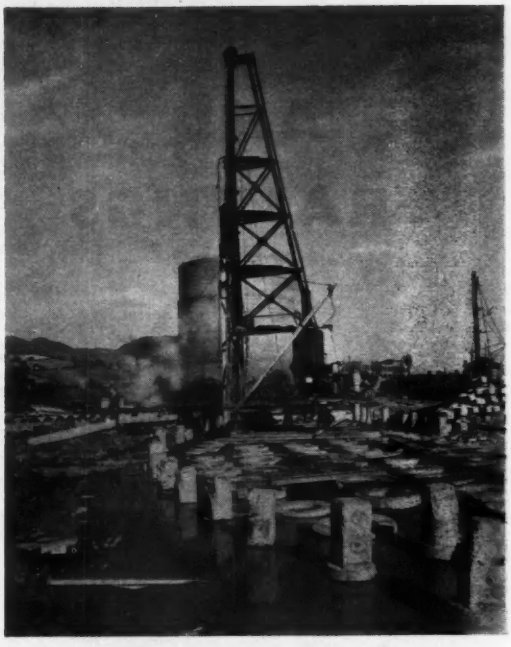

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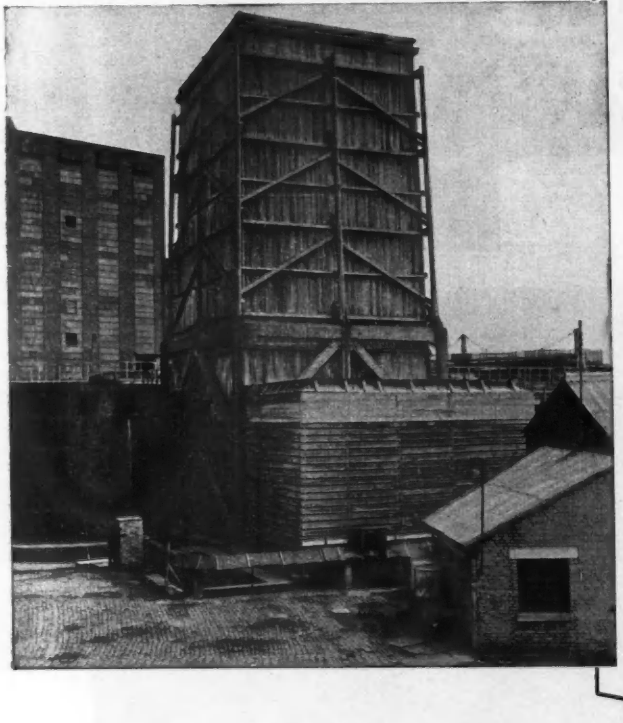

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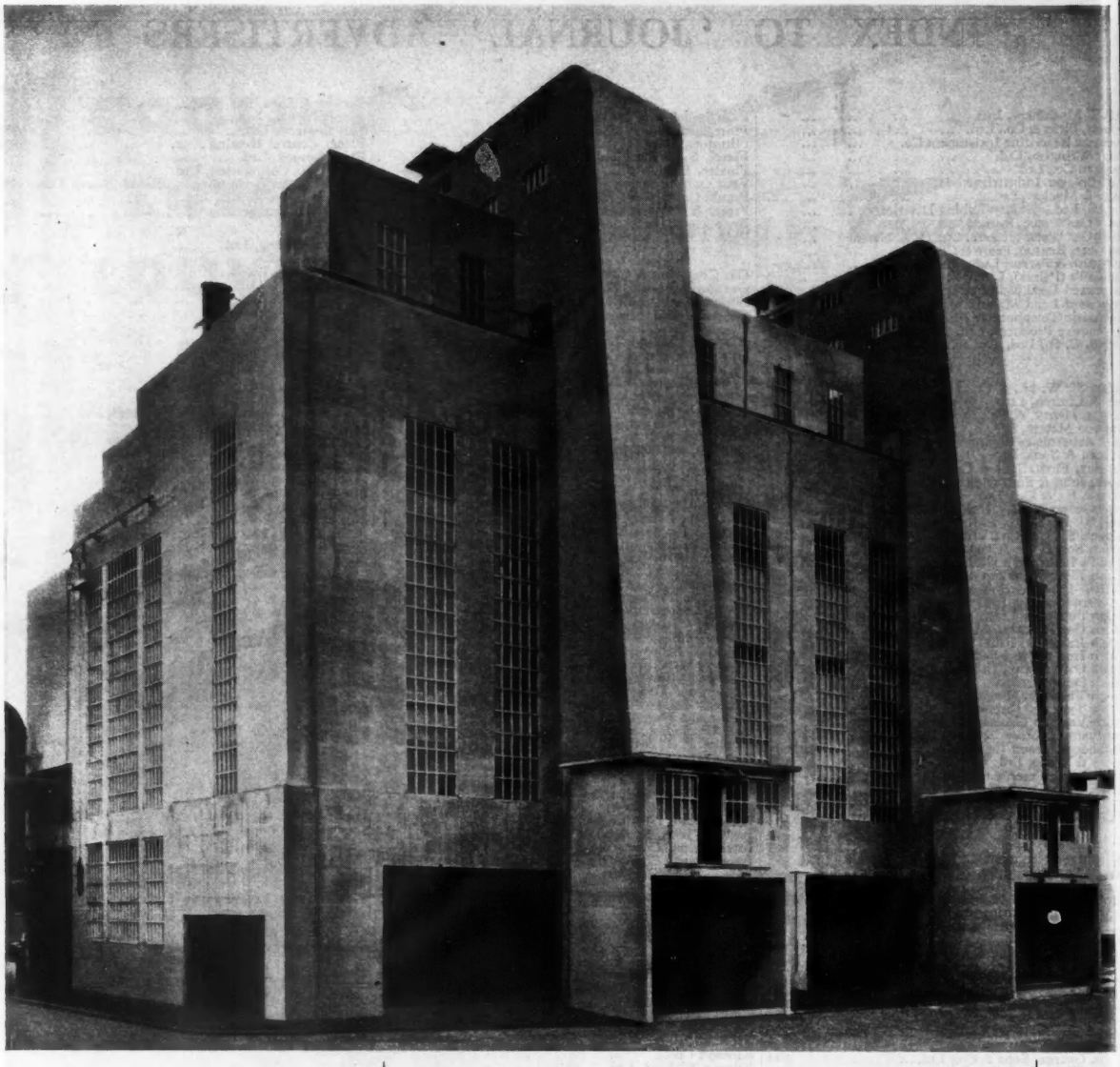

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COAL REPORT

THOUGH slightly shorter than in previous years, the National Coal Board's report for 1950 is still a voluminous document running to some 250 pages plus eight folding-plate tables of accounts for each division. As the country's first major essay into the field of public ownership, the coal industry has come in for especially close scrutiny, and it is fitting that the annual reports should lack nothing in detailed information on the industry's working. We suppose the public at large will be chiefly concerned with two aspects—first, is the industry paying its way and, second, is it producing sufficient coal to keep the wheels of industry turning as well as the home fires burning? Last winter's experience must inevitably leave us in some doubt as to the answer to the second question, and the present report does little to relieve public anxiety in this respect. Although output per manshift was the highest yet recorded (despite a decline in manpower of 20,500), the rise in productivity was not enough to make good the rapid rise in home consumption.

As regards the first question, however, the N.C.B. earned a surplus in 1950 of £8.3 mill. (compared with £9.5 mill. in 1949 and £1.7 mill. in 1948). Operating profits fell from £29.4 mill. to £24.2 mill. due to three main reasons—shortage of manpower, which reduced output in some coalfields; cuts in exports to help meet increased demand at home; and the increases in the prices of stores and materials. Capital charges payable to the Minister of Fuel and Power, at £14.5 mill., were £1.3 mill. higher than in 1949, but profits tax was £1 mill. lower at £2.5 mill. The Board began the year with a deficit of £12.3 mill.—so there remains £4 mill. to be eliminated before the Board can start to build up reserves.

Output of deep-mined coal at 204.1 mill. tons was about 1.5 mill. tons more than in the previous year, while opencast sites produced about a quarter of a million tons less at 12.2 mill. The total production was therefore 216.3 mill. tons. Home consumption increased by 6 mill. tons, while exports and bunker supplies were 1.4 mill. tons less. The amount of coal delivered to gasworks in 1950 is provisionally computed at 26.2 mill. tons—an increase of 3.3%, and coke ovens took a further 23 mill. tons—so that nearly a quarter of all coal produced is carbonised. The amount of coal carbonised in the Board's own plants was 9.3 mill. tons, and the amount of coke oven gas supplied for industrial and domestic use from such plants rose from 38,750 mill. cu.ft. in 1949 to 41,657 mill. cu.ft. in 1950. This was made possible by special measures at some plants, such as the addition of heavy oil to the coal before coking.

The pricing of coke oven gas, the report observes, is a difficult problem. The prices of coke and gas (and the other products of carbonisation) cannot be related precisely to their respective costs of production, since they are joint products of the carbonisation process. The cost of the whole process is known, but cannot be ascribed to coke and gas separately. Nor is the open market a guide. The argument is that there exists an open market for coke, but not for the Board's coke oven gas, most of which is in fact sold to the area gas boards. The price which the gas industry can pay for coke oven gas while fulfilling its statutory obligations is a matter not only of negotiation but also of contention, and it is good to note that the N.C.B. is in consultation with the Gas Council and the British Iron and Steel Corporation on this common problem and is confident that agreement will be reached on principles which will determine the price to be paid for N.C.B. gas ' in the public interest and not in the interest alone of the consumers of gas or those of coke.' Meanwhile, contracts for the supply of gas from individual N.C.B. plants have been and are being negotiated.

The Board is to be commended upon a comprehensive report and one which is published in good time—incidentally several weeks earlier than in previous years. The conclusions that can be drawn from the report

are related in large measure to the problem of shortage of manpower in the mines. It is undoubtedly a long term problem and one which must be tackled consistently perhaps for many years. There is the special difficulty, which must affect other industries as well, of the falling proportion of young people in the population. As Lord Hyndley points out in his observations on the report, there is for the coal mining industry a particular difficulty in that it has recruited too few young men in the past. It is not a job to which men can easily adapt themselves after a certain age. Like farming, it is not just another job; it is a way of life.

The tendency will be for coal consumption to continue to rise, and there is danger that the story of 1950 will be repeated. Yet these dangers can probably be avoided if, alongside the struggle to produce more coal, there is a campaign to use coal more efficiently—and in this the gas industry will continue to play its vital part.

LOWESTOFT MEETING

THUNDER and heavy rain heralded the first annual general meeting of the Eastern Section of the Institution of Gas Engineers last week on the extreme tip of the drier side of Britain. The 'first' meeting came 63 years after the formation of what was formerly the Eastern Association and not once before in all those years had Lowestoft been chosen as the venue for a meeting, notwithstanding the efforts of the publicity department of the famous Suffolk coast resort. Apart from these incongruities the meeting was in every respect normal—normal especially in the sense that the friendliness that is characteristic of the eastern counties was as much in evidence as ever—and indeed a record in point of attendance. It was a well earned tribute to one who had served loyally as Hon. Secretary and Treasurer since pre-war days that Mr. H. H. Redwood should fill the rôle of first Chairman under the new regime. He spends his professional life at Newmarket, capital of British horse racing, and the Management Committee had some difficulty in deciding whether the meeting should be held there or at Britain's fourth largest fishing centre; as someone remarked at the meeting, herrings were ultimately preferred to horseflesh.

The technical fare comprised the Chairman's Address, with the King's recent Festival of Britain speech as its text, and a useful discussion on the safety recommendations of the Institution of Gas Engineers, opened extemporarily by the Chairman-elect, Mr. T. C. Battersby, himself a member of the Gasworks Safety Rules Committee. The new Chairman set up another record by being elevated to that position while still Chairman of the London and Southern Section. The social side was enjoyable in every way, and a credit to the organisers, ably led by Mr. J. Hunter Rioch who, as a past President of the former Association, brings ripe experience to bear on his duties as Hon. Secretary and Treasurer. The Mayor welcomed the members at the opening of the business meeting and both he and the Mayoress received the guests at the reception and dance and graced the proceedings at the luncheon.

It was a pity that some of the words of wisdom uttered in the safety discussion were lost to posterity because members spoke from remote corners of the hall, where only near neighbours could hear them, instead of coming to the platform. If we dare venture one other criticism it is that the luncheon speeches were too many and too long, with the result that the afternoon programme, comprising a coach tour and a visit to the C.W.S. canning factory were late in getting off the mark and had in consequence to be rushed.

THE CLOSED SHOP

THE spectre of the closed shop has once again reared its ugly head—this time in Edmonton, whose Council has made membership of a trade union a condition of appointment for the post of borough engineer and surveyor. We should have thought that the salutory story of the Durham County Council's ungraceful retreat, under what was tantamount to a directive from the Minister, from its stand in relation to the appointment of school teachers would have served as sufficient warning to other authorities to steer clear of such interference with professional and personal freedom; and we are glad to note the official protest which has been forthcoming from the Engineers' Guild, which declares its resolve to resist such policies by every means in its power. It has not only approached the Edmonton Council direct but has also drawn the Government's attention to the matter.

There was timely reference to this contentious subject by Mr. E. L. Riley in his presidential address on June 12 to the annual conference of N.A.L.G.O. at Blackpool. 'We do not,' he said, 'believe in the closed shop in the sense in which the term is used today as meaning a trade union recruited to 100% membership by the compulsion either of its members or of employers.' It is gratifying to note that N.A.L.G.O.—the biggest union of blackcoated workers—has no use for pressgang conscripts. In the words of the president, theirs is a voluntary army each soldier in which serves not from outside compulsion but from an inner conviction of the rightness of his cause.

A CONTENTIOUS SUBJECT

THE subject is contentious. While all will agree with Mr. Riley in his objection to compulsion, one must not overlook the importance of the 'united front' when it comes to collective bargaining. One may reasonably criticise the *laissez faire* attitude of those who are ready and willing to accept all the benefits secured by a trade union or professional association without bearing their share of the labour involved in gaining those benefits. Mr. Riley attributes such indifference in most cases to ignorance or mental laziness rather than to any positive hostility. We believe, however, there is another reason—though not one which applies to N.A.L.G.O., which has resolutely set its face against T.U.C. affiliation. That is a natural reluctance on the part of 'ordinary people,' no matter what their creed, to align themselves openly with an organisation which, by its affiliation, is directly associated with a specific political party. There are many who feel that trade unionism should be right outside and above party politics and that under such conditions it would be all the stronger. For it is no longer a question of 'capital versus labour' or of 'employee versus employer.' No political party can claim a monopoly of either section, and collective bargaining would be far more harmonious and effective if freed from the intemperate atmosphere of political bias.

ASTONISHING GROWTH

MEMBERSHIP of N.A.L.G.O. has passed the 200,000 mark, which represents practically a doubling since 1938. Indeed, it has practically doubled its membership every 10 years since its inception and is now exceeded in size by only seven trade unions in the whole country. The same growth which has been so marked a feature of the Association as a whole has been reflected in all its activities, and there will be especial gratification at the enormous expansion of its educational work. N.A.L.G.O. played a large part in the revision, by the Local Government Examinations Board, of the system of promotion examinations and has secured a qualification, established by an independent examining body and recognised by all local authorities, for the administrative officer—the Diploma in Public Administration. To meet the needs of this new examination system, and of members generally, the Association has continued the reorganisation of its own correspondence institute and has extended its summer schools and other educational facilities. Mr. Riley makes the proud claim that no other trade union in the country gives its members so wide a range of services as N.A.L.G.O. He instanced, the legal department and the holiday centres and convalescent homes at the disposal of members, together with a building society and a benevolent and orphan fund.

NATIONAL PHYSICAL LABORATORY JUBILEE

THE National Physical Laboratory at Teddington had its origin in laboratories founded when German competition in the scientific and technological fields first began to be felt after the Franco-Prussian war. To mark its jubilee the Stationery Office has published a handbook written by Mr. J. Longdon-Davies on the work carried on there, describing how the separate departments are organised and unified today under the Department of Scientific and Industrial Research. The pressing economic needs of the times are reflected in the outstanding activities of some of the departments, notably the building research and marine (ship testing) divisions. All types of ships, except warships, are tested at Teddington, and it is recorded that in more leisurely days there was a director who satisfied himself that Noah's ark was a sound and seaworthy craft by building a model to the specification laid down in Genesis and sailing it. The work of the N.P.L. has long since outgrown the restricted accommodation at Teddington and various branches of its activity are housed as far apart as Clydebank and Watford. Several schemes are in hand for transferring other sections of the laboratory elsewhere.

Writing of jubilees reminds us that at the recent annual meeting of his company Mr. H. Cecil Booth, Chairman of the British Vacuum Cleaner and Engineering Company, recalled that the year marked the 50th anniversary of the granting of his patent for the first vacuum cleaner which resulted in the formation of the company—the founder and pioneer of the vacuum cleaner industry throughout the world. The gas industry has a special interest in the development of the vacuum cleaner inasmuch as the principle has been successfully applied to ash and dust removal in industry for many years.

IDEAS GRATEFULLY ACCEPTED

CONSIDERABLE interest has not unnaturally been aroused by the recent action in the King's Bench Division in which a gas board was sued for alleged trespass and wrongful entry by a meter inspector—an action in which judgment was given for the defendant board. Many newspapers commented on the case, and there was a spate of correspondence in their columns. We pick out an example from a Bradford paper in which a reader described how he overcame the problem by fixing his gas meter in a cupboard in the outside wall of his house. No one will seriously advocate a wholesale refixing of meters to meet a problem which, after all, probably arises only exceptionally. There is, though, a germ of an idea here for future houses in the building. Meter inspectors speak feelingly of how they have to creep on all fours into dark recesses under the stairs or grovel beneath sinks to read the meters, even where they can gain ready entry to the premises. It would facilitate their work if they could open a little door at eye level and take their reading in full light from outside. Moreover, by this means space is saved within the house and easier initial fixing might be achieved. We would add that we are fully aware of British Code of Practice 331, 102 (1947).

The particular correspondent from Bradford carried his idea still further by the provision of a cupboard for the milk; but let us express a timely word of caution lest the house of the future be decorated by a whole battery of little doors in the outside wall—resulting inevitably in acrimonious exchanges with one's tradespeople because the baker's boy popped the loaf into the meat cupboard while the butcher in a fit of misplaced zeal thrust the Sunday joint into the compartment reserved for cheese. And when the coalman shoots his load through the aperture intended for vegetables one begins to wonder whether the simple answer to the problem is not just to leave the back door unlatched.

Many gas undertakings have their own remedy. If the meter inspector cannot get in he leaves a post-card inviting the consumer to indicate the position of the pointers on little dials reproduced on the card or, if direct reading, merely to record the figures. Errors on the part of the consumer can easily be corrected at the next reading. The emptying of slot meters provides a rather different problem, since few consumers would relish entrusting their coins to a box accessible from outside. We leave it to other 'regular readers' to submit more bright ideas for the solution of this one. No cash prize is offered for the most practical suggestion, but sufficient reward may perhaps be found in the undying gratitude of the meter inspector.

REGIONAL BOARDS FOR INDUSTRY

ELEVEN years after their introduction the Regional Boards for Industry are described in a booklet issued by the Treasury and the Central Office of Information as 'a new idea in the development of relations between Government and industry.' Growth of State responsibilities has made it impossible to secure efficient administration from one centre, and the boards are a natural outcome of increasing Government decentralisation. They continue the joint consultation between employers, workers, and officials which developed during the war and which at national level is now provided by the N.P.A.C.I. (National Production Advisory Council on Industry). Known at first as area boards, the regional boards were introduced in 1940 to secure the maximum effort for war production. After the war they were reconstituted as advisory instead of executive bodies and their scope was extended to cover all industry, including mining, agriculture, and transport. The boards comprise independent chairmen, who give part-time service, and equal numbers of representatives of employers and employed, who give their services freely and without remuneration. The appointments are made by the Chancellor of the Exchequer in consultation with representative

organisations, and each chairman appoints two vice-chairmen, one from each side of industry, from the members of the board. Senior regional representatives of the Ministry of Fuel and Power and other Government departments are also full members. Meeting normally once a month the boards deal with a wide variety of industrial matters, ranging from fuel and power shortages and effects of gas and electricity service charges to shopping facilities and the provision of day nurseries for children of women employed in industry. Although the boards are advisory they have occasionally been called on to undertake specific executive tasks, one of the most difficult of which has been the organising of the spreading of the peak industrial electricity load during the winter. Scotland and Wales each has a regional board and England has nine. The booklet completes its survey of industrial regionalisation by giving an account of the work of the N.P.A.C.I., the national counterpart of the regional boards, and its liaison with the N.J.A.C. (National Joint Advisory Council) and the E.A.C. (Engineering Advisory Council). Arrangements for consultation on economic planning matters are provided by the E.P.B. (Economic Planning Board), set up in 1947, with separate economic conferences for Scotland and Wales.

Letters to the Editor

SPIRAL CHUTES

DEAR SIR,—Prevention being better than cure, I was very interested in the Institution paper, by Mr. L. J. Clark and Mr. J. H. Walker, especially in section F, Degradation of Coke, and was pleased to learn that other investigations are being made.

In a coke bunker there are two main sources of coke degradation.

(1) When filling, the breakage of coke as it falls by gravity into the bunker.

(2) When emptying, the wear and tear by attrition of the coke surfaces as each submerged cob of coke, burdened by the dead weight of superimposed coke, fights its way, jostled by its neighbours, from the larger areas of the bunker to the narrower confines of the bunker outlet.

It is chiefly this attrition, which, by grinding exceedingly small, gives rise to unwanted fines and objectionable dust. Yet, the spiral chute described in the paper makes no attempt to prevent degradation by attrition. Many years ago, with the object of achieving this double saving, I designed a modified spiral chute.* Its trough was arranged on its side, the opening facing inwardly to the axis of the spiral. Thus, one side formed the floor for the descending coke, the opposite side formed a roof, and the bottom of the trough retained the coke in its spiral descent. The chute was longer and terminated in the near vicinity of the bunker outlet. When filling, its operation was precisely as the chute described in the paper, and should therefore be equally efficient.

When emptying, the spiral column of coke within the spiral chute, being protected from the superimposed weight of coke in the bunker, gravitated freely to the bunker outlet, with the minimum of wear and tear of attrition, the flow being maintained by coke gravitating into the chute from the free surface of the coke lying in the bunker.

In model form, this double-purpose spiral chute worked well, and gave every promise of success, but it was never applied, possibly because the lesser degree of degradation of coke in the relatively small bunkers, and small tonnage, of the period, did not justify its cost.

The present-day trend, to attain greater overall economy by carbonising in very large units entails larger coke screening plants and larger coke bunkers; so that, other things being equal, there will inevitably be an increased degradation of coke, so that, something must be done about it.

Fortunately, the considerable increase in tonnage brings its own reward, for the savings, though small per ton, are cumulatively sufficient not only to pay for the spiral chute, but to increase the revenue from the sales of graded coke.

Yours faithfully,
H. J. TOOGOOD.

43, Uxbridge Road,
Hampton-on-Thames.
June 8, 1951.

* Gas Journal October 22, 1930, p.225

USE OF BUTANE

DEAR SIR,—Although one may admire the contribution to knowledge, made by Mr. A. D. Howells in his paper published in the *Journal* of May 23, and since the author was at obvious pains to be as informative as possible, it is all the more regrettable that the contribution was marred by some rather glaring mathematical errors and inconsistencies. Before commenting upon the merit or otherwise of the case put forward, we offer the following corrections.

(1) *Page 521. 'Gas Oil.'*—0.85 therms is equal to 189 cu.ft. of 450 C.V. gas *not* 187 as stated. Therefore, 60,000 cu.ft. of gas require 317 gallons of oil, *not* 322 (N.B.—Even using Howells' figure in this case, the requirement would be 321 gal., *not* 322), and the cost per therm is therefore 17.3d., *not* 17.59d.

(2) *Page 521. 'Butane.'*—C.V. is given as 3,200 B.Th.U. per cu.ft.; page 522, 'Physical Properties,' the value is given as 3,300; on page 523, line 15, as 2,900 (though this last was contributed by Mr. Edwards).

(3) *'Effects on District.'*—If the specific gravity is to be maintained between 0.68 and 0.70, while adding 29% of butane (sp.gr. 2.0), the producer town gas mixture to which it is added would have a specific gravity of 0.141 to 0.169—an obvious impossibility.

Later it was stated: 'In order to maintain supplies for short periods, it was found necessary to use 50.45% of butane . . . . and specific gravity 0.82.' How is it possible to obtain a mixture with sp. gr. 0.82 if 50% is butane of specific gravity 2.0?

(4) *Page 522, top line.*—'The physical property . . . . is that on compression of the gases to a high pressure they are easily at ordinary temperatures and comparatively low pressures converted into liquids.' This clause is quite unintelligible.

(5) *Page 522. 'Physical Properties.'*—The first six properties appear to refer to normal butane, the seventh (air requirements) to propylene, and the eighth to propane. The sulphur appears to be incredibly low for 'butane normally supplied for industrial and domestic purposes,' seeing that the normal top limit for this gas is exactly 10 times the amount quoted.

Going on to discuss the paper as a whole, it appears that (as is perhaps understandable in a paper on manufacture) the subjects of appliance modification, specific garvity variation, increase in unaccounted-for gas, have been hurriedly glossed over. Although butane-air or other mixtures may be used on existing town gas appliances, the distribution problems are many and complicated. The ordinary dry meter deteriorates rapidly and too much reliance should not be placed on statements, as made by Mr. Edwards, that 'the usual types of cocks and valves had been found to be satisfactory (after re-lubrication).' The statement, also by Mr. Edwards, that 'a suitable performance from that burner (hotplate ring) had been obtained by increasing the number of drilled holes on the outer ring' may be quite true of the particular burner in question, but if the gas industry sets out on the assumption that this is true of all, or even of the majority, of drilled ring burners, it is in for a sad awakening. In any case, if the statement applied to all ring burners, one can imagine the problems involved in drilling every hotplate (and oven?) burner on the district.

On the question of economics, Mr. Howells appears to be anticipating a figure for butane producer gas—town gas of about 1s. per therm into holder, which appears to be highly optimistic.

Yours faithfully,
T. H. TAYLOR,
Chief Engineer.

Calor Gas (Distributing) Co., Ltd.,
Weybridge,
Surrey.
June 8, 1951.

Personal

Mr. G. W. Denman, formerly of Swanage, Walton-on-Thames, Falmouth, and Bexhill-on-Sea, has been appointed Engineer to the Hamilton Gas Department, New Zealand.

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Mr. William C. Hogg, District Manager, Kelty, has been appointed by the Scottish Gas Board to be District Manager of the joint undertakings Kelty and Lochgelly.

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Mr. F. S. Davies, Group Accountant, Long Eaton, has been appointed Deputy Group Accountant, Nottingham group, Notts and Derby Division, East Midlands Gas Board.

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Mr. Fred A. Collier, who has been an Hon. Auditor of the Manchester District Junior Association of Gas Engineers for the past 25 years and a member for 50 years, will retire from business at the end of June. Mr. Collier, who is now 78 years of age, started his service with George Orme and Co., Ltd., in September, 1884, and will therefore have completed 66 years and nine months' service when he retires. He has been a member of the Manchester Royal Exchange for 30 years.

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Mr. Stanley Hooker, Co-partnership Secretary of the former South Suburban Gas Company, is retiring after just over 40 years' service. His retirement follows the termination of co-partnership and the redundancy of the office of co-partnership secretaries. In the Livesey Memorial Hall at Sydenham, before a large number of employees, Mr. Tom Brown, member of the South Eastern Gas Board and late Managing Director of the South Suburban Company, recently presented Mr. and Mrs. Hooker on behalf of his many colleagues and friends with a bureau and two armchairs. Expressions of appreciation of the services rendered by Mr. Hooker were made by Mr. Brown, Mr. Gibson (Divisional Engineer), Mr. Horlock (Sales and Service Manager) and others. Mr. Hooker was also recipient of other gifts from members of his personal staff. He will be remembered for his work as Secretary to the Co-partnership Nationalisation Committee which had a lot to do with the granting of an extension of co-partnership for a period of two years after nationalisation.

Obituary

Mr. William A. T. Woosnam, formerly Manager of the Rothwell undertaking (East Midlands Gas Board), died on June 1. Mr. Woosman went to Rushden from Milford Haven in 1947.

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Mr. R. N. Webb, Works Manager at the New Wortley works, Leeds, for 34 years, died at the home of his elder son at Nottingham on May 28. Mr. Webb was President of the Manchester District Association of Gas Engineers in 1937.

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Mr. Joseph George Clark, Engineer and Manager of the Newton Abbot Gas Company from 1884 until 1938, for 29 years of which period he also held the position of Managing Director of the Company, died at his home at Kingsteignton on June 4. He was responsible, just before the war, for the merging of the Newton Abbot and Bovey Tracey gas undertakings. Mr. Clark was a son of the late Mr. Richard Clark, who was for a long period Engineer of the former Devonport undertaking. A widower, he leaves two daughters and a son.

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We regret to report the sudden death at the early age of 46 of **Mr. Joseph Clegg,** Assistant General Manager of West's Gas Improvement Company, Manchester, on June 4. On the completion of his pupilage with the Company he was appointed to the outside staff and later was responsible for the erection of progressively large installations of Glover-West vertical retorts at home and abroad. During the war Mr. Clegg was in charge of the assembly of fighting vehicles at Albion Ironworks. At the conclusion of hostilities he became Deputy Works Manager and soon after Assistant General Manager; in these positions he endeared himself not only to his colleagues but to all those in the gas industry with whom he came into contact. Mr. Clegg was a member of the Institution of Gas Engineers. He leaves a widow and three children.

Diary

June 22.—Waverley Association of Gas Managers: Annual Meeting, North British Hotel, Edinburgh. 10.15 a.m.

June 23.—Wales and Monmouthshire Junior Gas Association: Ladies' Day.

June 23.—Western Junior Gas Association: Summer Meeting and Ladies' Day, Torquay.

June 23.—Manchester District Junior Association of Gas Engineers: Ladies' Day, Chester, and visit to Chester works.

June 25.—North Eastern Gas Consultative Council: Leeds, 2.45 p.m.

June 26.—Eastern Gas Consultative Council: Connaught Rooms, Great Queen Street, W.C.2, 2 p.m.

June 28.—North Thames Gas Consultative Council: Westminster City Hall, Charing Cross Road, 2.30 p.m.

June 29.—Northern Junior Gas Association: Annual General Meeting.

June 30.—London and Southern Junior Gas Association: Ladies' Day and Summer Outing, Windsor, Cookham, and Marlow.

July 3-6.—Royal Show, Cambridge. Gas Council exhibit.

July 3.—South Eastern Gas Consultative Council: Quarterly Meeting, Goring Hotel, Victoria, 2.15 p.m.

July 3.—East Midlands Gas Consultative Council: Annual General Meeting, Victoria Station Hotel, Nottingham, 11.30 a.m.

July 4.—Institution of Gas Engineers (London and Southern Section): Summer Meeting, Watford, 10.30 a.m.

July 5.—Institution of Gas Engineers (South Western Section): Summer Meeting and Ladies' Day, Exeter.

July 10.—Women's Gas Federation: Festival Fare Cookery Competition Finals, Park Lane Hotel, London, W.1. Presentation of Prizes by H.R.H. Princess Elizabeth.

July 11.—Gas Council Commercial Managers' Committee, Gas Industry House. 10.15 a.m.

July 11.—National Benzole Association: Annual Meeting, Wellington House, Buckingham Gate, S.W.1, 3.45 p.m.

July 20.—Manchester and District Section, I.G.E.: Chairman's Day. Luncheon, Bolton Town Hall. Visit to Wigan gasworks.

July 27.—Northern Junior Gas Association: Address by A. Pillans, Works Manager, By-Product Works, Northern Gas Board, followed by a visit to St. Anthony's By-Product Works, Northern Gas Board, Newcastle.

NEW SCOTTISH DEPOSITS OF COKING COALS

An announcement by the National Coal Board that coking coal deposits have been proved in the Queenslie area near Glasgow is of considerable importance to Lanarkshire where the early steel, iron, and chemical industries were based on ample supplies of excellent coking coal. In recent years the depletion of these reserves has been a cause for some concern among users and notably among steelmakers.

Bores at Queenslie Bridge have shown that three of the most useful seams of coking coal continue beyond the Comedie Fault, at thicknesses which seem to promise economic working. If these early anticipations are borne out by later bores the opening of a new field of some 70 mill. tons of good quality coking coal seems likely. To date it has been a matter of speculation among mining engineers whether these seams did, in fact, continue at workable depths and thicknesses, and the preliminary assurance of the bore at Queenslie is therefore of considerable importance.

The Combustion Engineering Association, in collaboration with the British Coal Utilisation Research Association, is holding a conference at the Palace Hotel, Buxton, on July 10 and 11, on 'Engineering Aspects of the Operation of Gas Producer Plants.' Details from the Director of C.E.A., 6, Duke Street, St. James', London, S.W.1.

Mr. F. Taylor, Chief Instructor, Ascot Gas Water Heaters, Ltd., recently gave a series of lectures on the regulation and maintenance of new types of Ascot gas water heaters to inspectors, fitters, and maintenance personnel of the Maidstone district, Brighton division, and Rochester district of the South Eastern Gas Board. His itinerary covered four days and in this time he addressed 278 persons.

The Women's Gas Federation has formed a branch at Worksop. The officers and committee elected, who have agreed to act until a general meeting is held in September, are: Mrs. Snell (Chairman); the Lady Mayoress, Mrs. J. Wilkinson, who accepted the office of Branch President; and Mrs. E. Morrell (secretary). Miss D. W. Pidsley, headquarters secretary, addressing a members' meeting on the occasion of the presentation of prizes for Stage I of 'Festival Fare,' spoke on the aims and activities of the W.G.F.

A Party of Employees of Robert Dempster & Sons, Ltd., Elland, members of the firm's Engineering Society, visited Birkshall gasworks, Bradford, on June 8, to inspect the coke handling plant which has recently been erected by the firm, and other plant on the works. Members of the Board's staff conducted the party round the works. About 40 members of the Society took part and at the conclusion of the visit Mr. J. Bishop, General Manager, and a Vice-President of the Society, expressed thanks to the Board for the facilities which had been granted.

News in Brief

Darlington Town Council has approved a resolution that local authorities should have the right of direct approach to the Northern Gas Board on the question of gas charges. The Council approved the resolution after hearing a report that the Gas Board had recently refused to see representatives of local authorities on the grounds that the body authorised to deal with complaints was the Gas Consultative Council.

Scottish Rural Gas, Ltd., the largest distributors of bottled gas in Scotland, has opened a new showroom in Aberdeen at Crown Mansions, Union Street, Aberdeen. This new showroom was opened in time for the Highland Show in June and supplements the main depot in Great Northern Road, Aberdeen.

New Coal Tar Constituent.—In a letter to *Nature*, of May 26, H. B. Nisbet and A. M. Pryde, of the Heriot-Watt College, Edinburgh, report that during an investigation of the nitrogenous bases extracted by sulphuric acid from the 'benzole absorbing oil'-fraction of coal tar, they have isolated a solid base which has been proved to be 2 : 3 : 5 : 6-tetramethylpyridine, a compound not hitherto reported as a constituent of coal tar.

Midland Juniors Ladies' Day

There was a record attendance of more than 200 at the Midland Junior Gas Association Ladies' Day when a visit was paid to the Potteries on June 7. This was the last function in the presidency of Mr. J. Palser.

In the morning there was a visit to the Etruria gasworks, Stoke-on-Trent, and subsequently those participating went to the Grand Hotel, Hanley, where luncheon was provided at the invitation of Mr. J. E. Stanier (Manager, North Staffs Division, West Midlands Gas Board). The chair was taken by Mr. Palser.

Mr. Stanier cordially welcomed members and the ladies. He said that was the second visit to the district because there was a joint visit with the Manchester Association in 1947. In the works which they had seen they claimed to have a high degree of efficiency and they certainly had an exceptional output. In 1945 it was 3,500 mill. cu.ft., but this year they expected to reach 7,500 mill. cu.ft. Mr. Stanier paid a tribute to the engineers and staff for the loyal service and co-operation without which such an achievement would not have been possible. In the North Staffs division they had 175 continuous gas-fired kilns in use by the ceramic trades. They used 4,100 mill. cu.ft. last year, which was equal to 60% of the total output at Stoke-on-Trent. The amount would show a further increase this year.

Mr. Palser expressed thanks to Mr. Stanier for his welcome and for the hospitality extended, and Mr. J. A. Tomes thanked the West Midlands Gas Board and the pottery firms for their invitations to visit the works. Mr. A. E. Hewitt, a member of the Board, replied.

In the afternoon visits were paid to various pottery works.

SHEFFIELD AND ROTHERHAM SALES CIRCLE AT LEEDS

The photograph above was taken on May 31, when, under the chairmanship of Mr. A. Wylie, Sales and Service Manager (Sheffield), 60 members of the East Midlands Gas Board (Sheffield and Rotherham division) Sales and Service Circle paid a visit to the Leeds Production Centre of Radiation Group Sales, Ltd., Armley. On arrival the party was welcomed by Mr. F. Bowen, Managing Director, and other officials. Mr. G. W. Brooks (Radiation Group Sales, Ltd.) then gave a talk on the technical considerations behind the design and construction of the 1430 series cooker, followed by a few notes on coke consuming appliances and in particular the Radiation Yorkseal range. After lunch members were conducted over the works.

A Difficult Pile-Driving Job

An interesting contract for the foundation of a new 5 mill. cu.ft. gasholder weighing approximately 45,000 tons, has recently been completed under difficult and unusual conditions for the Scottish Gas Board at Dumbarton gasworks

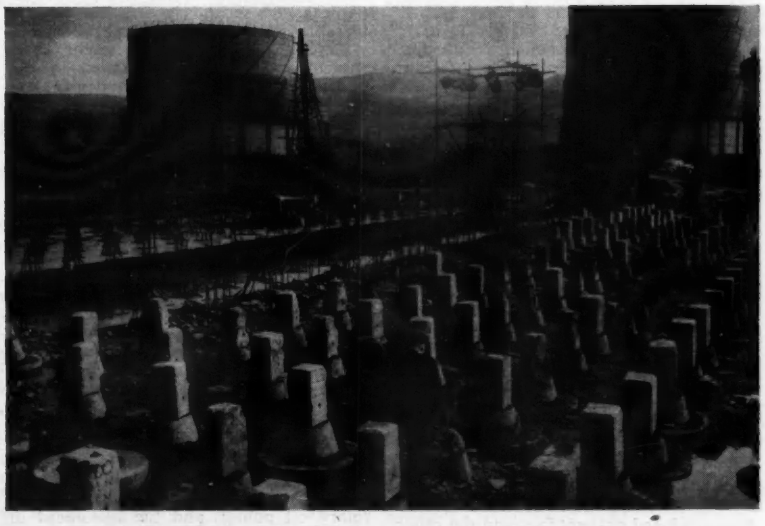
THE site chosen for the new holder is adjacent to the gasworks, on waste ground, which was considered unsuitable for agricultural or building purposes. A notable feature of the contract was the fact that because of abnormal weather conditions, the contractors were obliged to do a considerable amount of pile-driving at night, with the use of artificial lighting. This work was carried out most successfully, without any accidents.

The standing water level on the site was found to be three feet below the surface. The special type of collar piles used were considered to be ideally suited for such water bearing strata. Altogether, the work involved the making and driving of 1,425 pre-cast reinforced concrete main collar piles, and 575 pre-cast reinforced concrete sheet piles.

To Carry 45,000 Tons

The main piles were 25 ft. long, having enlarged sections near the head, square tapered shafts, and points without shoes. A short length of 14-in. square shaft, which takes the blow from the hammer, extends above the enlarged section which is 2 ft. diameter. The main piles were driven through the pre-cast circular collars. The sheet piles were 25 ft. long, 13½ in. wide, and 6 in. thick, and were shaped at the sides to form a bird-mouth interlock. The consolidation of such a large area by sheet piling will act as a stabiliser, and will ensure vertical settlement of the gasholder on the foundations. The total weight to be carried being in the region of 45,000 tons.

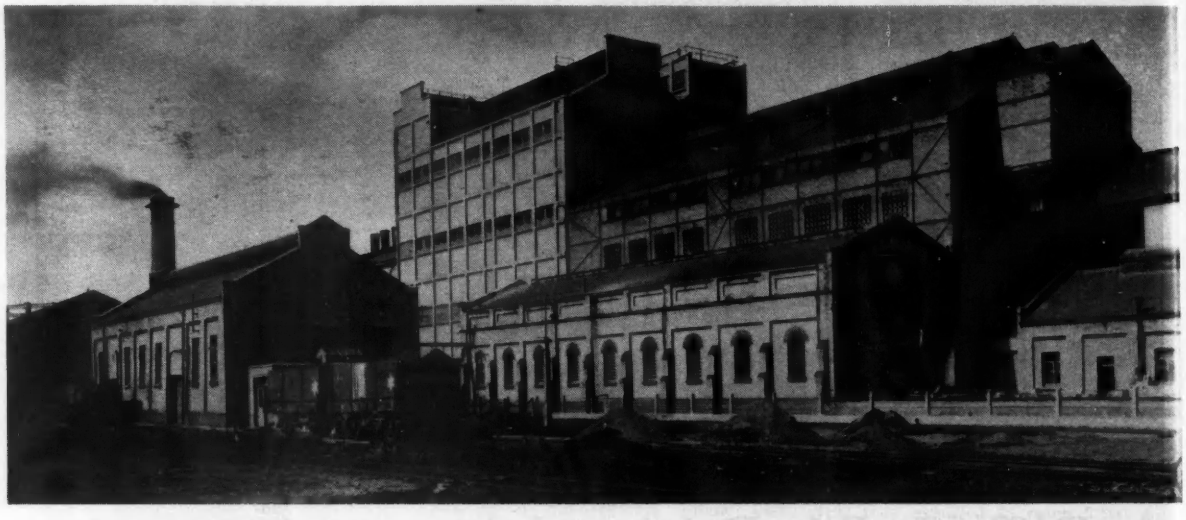
Working in two shifts, the main piles were driven by two frames. Two-ton single-acting steam hammers were used. The sheet-piles were driven by a portable double-acting steam hammer, assisted by jetting.



Photograph showing three stages of preparation of the steelwork for the foundation slab.

The work was carried out by the Brydon Construction Co., Ltd., Glasgow, under the supervision of Mr. A. McFadyen, Engineer and Manager, Dumbarton gas undertaking. The consulting engineers were Messrs. F. A. Macdonald & Partners, Glasgow. The contractors for the new 5 mill. cu.ft. gasholder are Messrs. Newton Chambers & Co., Ltd., of Sheffield.

An 'At Home' with a difference has been arranged by Mr. Lindsay Burns, Works Director of Henry Balfour & Co., Ltd., of Durie Foundry, Leven, Fife. On the afternoons of June 26 and June 28 to coincide with the local Festival week friends and relations of workers are to have an opportunity of seeing over the factory under normal working conditions. Visitors will have the chance of seeing much important chemical and other plant in course of assembly and also the industrial X-ray equipment used for examining welds under Lloyds Class 1 standard for pressure vessels.



NORTHAMPTON'S GAS-MAKING PLANT

THIS month new gas-making plant was officially opened at the Northampton works of the East Midlands Gas Board. It consists of two benches each of 24 40-in. Glover West continuous vertical retorts with a total throughput of 203 tons of coal and a total gas make of approximately 3½ mill. cu.ft. per day. Each bench is divided into three beds of eight retorts set four in line, and each bed can be let down cold or heated up independently of the others. Coal is tipped from the railway wagons by a 'Rotaside' wagon tippler into a 40-ton capacity receiving hopper, from which it is fed by travelling tray conveyor to a breaker, and thence by either of two continuous lip bucket conveyors followed by a flat steel band conveyor to the overhead coal bunkers having a capacity equal to 48 hours supply. Coke is delivered via an electrically driven travelling coke bogey on to a 36-in. band conveyor just below floor level and in turn conveyed to either of two lip bucket conveyors and 30-in. band conveyors to the grading plant and storage bunkers. Coke required for gas producers is taken from the lip bucket conveyors into a hopper specially constructed in the retort house.

Two waste heat boilers are included. One is provided with a steam turbine driven induced draught fan, and the other with an electric motor driven fan. Each boiler has a capacity of 5,600 lb. of steam per hour. Alternating current generated is in parallel with the Electricity Board's mains.

The Retorts

The retorts are similar in shape to those existing in the other retort houses, but are 40 in. on the major axis as against 33 in. on the earlier retorts. They are about 25 ft. high and are heated in accordance with the balanced heating principle. The fuel gas generated in the external pressure type producers is introduced on both sides of the bench and ignited with preheated secondary air at a point close to the fuel gas nostrils. The flames and products of combustion travel towards the centre of the bench and rise to circulating chambers around the upper zone of the retorts. The bench is self insulated effectively with the fuel gas and secondary air, and a considerable increase in thermal efficiency is thereby obtained. The sector coke extractor mechanism is actuated by oil pressure. The timing arrangement of the individual coke extractors is provided by cyclic controllers serving each bed of eight retorts, and the cam arrangement existing in these controllers ensures that only one retort at a time is being extracted. A feature of the individually operated sector discharger is that surges of coal gas from the retorts after the drop of the charge are kept to a minimum. The actuating oil pressure for the sector coke extractor mechanism is provided by duplicate electrically driven rotary oil pumps, and the oil stored in nitrogen charged hydraulic accumulators. The working pressure is 1,750 lb. per sq. in.

OFFICIAL INAUGURATION

The recorders and meters associated with the carbonising plant are conveniently housed in a brick built instrument house just outside the retort house, and this building is provided with adequate window space so that the instruments can be read without the plant operators entering the building. The instruments cover all the temperatures and pressures necessary for the efficient running of the plant. The flow meters and integrators are also incorporated on the instrument panel. The sector coke extractor power cabinets are housed in this instrument house.

As in the case of the instruments, all the electric motor starter equipment together with the associated fusegear are housed apart from any other equipment in a brick built building exterior to the retort house.

The output of gas from the Northampton works has risen sharply since the end of the war. In the year ended March 31, 1951, it was 1,968 mill. cu.ft., an increase of approximately 25% compared with 1945, while the increase in gas made in the last 10 years is approximately 55%.

Opening Ceremony

The plant was officially inaugurated by the Mayor of Northampton (Councillor Frank Lee, who is also a member of the East Midlands Gas Board) setting a wagon tippler in motion. He was introduced by the Chairman of the Gas Board, Mr. H. F. H. Jones, who paid tribute to the foresight of the Directors of the old Northampton Company in ordering the plant. One of those Directors, Alderman Percival, was among the guests. Mr. Jones also recalled the fact that John West began his career as a pupil in the Northampton works in 1854. Mr. Ernest West and Mr. John West, son and grandson respectively of the founder of West's Gas Improvement Company, were there that day.

After an inspection of the plant and a group photograph, the party were entertained at luncheon at Franklin's Gardens Hotel, where the chief guests were Mr. R. T. Paget, Socialist M.P., and representatives of the County Borough, County, and neighbouring Rural Councils.

Mr. C. C. Wood, General Manager of the Leicester and Northants Division, ably proposed the toast of the Borough Council. The Mayor, in replying, made many interesting references to James Sharp, a pioneer of gas cooking. [Sharp

(*Concluded on opposite page*)

Tendency to Lower Salary Standards

Nalgo Warning Against Cheeseparing

Recent activities in the gas industry concerning the conditions of service of the staff were reviewed by Mr. L. A. Garratt, Gas Officer, at a meeting of gas staffs forming part of the annual conference of the National Association of Local Government Officers at Blackpool on June 11. New salary scales were operative from April 1, 1950, but re-grading was not completed until early in 1951, and in some areas not until more recently.

WHEN the new scales were negotiated, said Mr. Garratt, no general increase in salaries was promised; on the other hand it was expected that area boards would evaluate posts more in keeping with present conditions, but only a minority had received comparatively small increases.

'There is a tendency, which is apparent from current advertisements, to lower salary standards in the industry. We appreciate that area boards must watch expenditure with an eagle eye if they are to continue to provide a gas service at a price the consumer is willing to pay for it, but it is a mistaken policy to expect an efficient first class service while at the same time cheeseparing the salaries of those who do the day-to-day administrative and technical jobs.' Such a method could only create a feeling of dissatisfaction among staffs and would do nothing to attract the type of person required in the future, when it was hoped the fuel position would revert to normal and when gas would face more competition from other services than it did today.

Negotiating machinery for gas staffs was now getting into its stride and the negotiations during the past year had been carried out in an atmosphere of goodwill and better understanding. One or two matters had been dealt with directly by the employers which it was considered should have been discussed jointly, but these had been in the nature of teething troubles and it was hoped that both sides would realise the full value of the Whitley machine, to which Nalgo pinned its faith.

Overtime Bonus

Not all the decisions of the Joint Council had proved popular in their application; for instance, the payment for overtime by a bonus. Before its introduction many staffs enjoyed overtime schemes which ensured a payment based on salary in relation to the hours worked. In place of that, a scheme was introduced by which the area boards would consider sympathetically the payment of a quarterly bonus for prolonged, recurring, or exceptional periods of overtime. This had proved unpopular and had caused considerable dissatisfaction, possibly not because of the payments made, although there were a number of appeals on that account, but owing to the veil of secrecy surrounding the method of calculation adopted by some boards.

Mr. Garratt said Nalgo had played a major part in the establishment of the National Joint Standing Committee for Intermediate Grades and in negotiating an agreement for scales of pay and conditions of service for them. It also took its full share in the difficult task of reaching a satisfactory settlement on the termination of co-partnership schemes. The arrangement made in that respect was a reasonable one in the circumstances and much better than was envisaged by many.

Protracted discussions had taken place between representatives of the Gas Council, Nalgo, and the Gas Officers' Guild on the establishment of a National Council for Senior Officers. A constitution had been agreed and the first meeting of the Council was to be held this month. Area joint councils for gas staffs were now operating in each area; most of them were meeting regularly and discussing staff problems in a co-operative way. There were areas where meetings might be held a little more frequently. A model constitution for local joint committees had recently been adopted at national level and sent to the areas. Those committees would deal primarily with safety, health, and welfare, but would also provide a means of discussing problems at local level, except on salaries and conditions of service, which would continue to be dealt with at that level by representatives of the unions and the employers.

'Many enquiries are being received concerning the superannuation scheme to be introduced for staff employed in the industry,' said Mr. Garratt. 'The preparation of this is a duty of the Gas Council in consultation with the appropriate Ministries; nevertheless, representations have been made to the Gas Council that the observations of the staffs representatives should be sought before the scheme is finally drafted; this they have agreed to do.'

Complete machinery as provided for by the Gas Act had been established. It was now up to those concerned with the industry to see that it worked efficiently and in the true spirit of Whitleyism.

NORTHAMPTON'S NEW GAS-MAKING PLANT—

entered the employ of the Northampton Gas Company as Assistant Manager on its formation. Many references were made to him in our Centenary Book, pp. 114-115.—Ed. *G.J.*]

Mr. R. T. Paget, K.C., M.P., after remarking that it was a great pity, and a historical accident, that nationalisation became a political issue, made a political speech of moderate length and then very briefly proposed the toast of the East Midlands Gas Board.

The Chairman of the Bord responded. He was proud of all those who made up the Board, both on the works and in the office. If they did a good job, they liked it to be recognised; if they did a bad one, they expected the kicks. Though the Board controlled a large and varied area they looked upon personal contacts as all-important. For that reason they met as often as possible at their many works. The present occasion provided the chance, seldom met, of entertaining representatives of the local authorities. After quoting instances of how planning over a large area had already enabled the Board to cope with difficulties in times of stress, Mr. Jones said he wished to place on record the co-operation they had received from the staff of the old Gaslight Company and to pay a tribute to the foresight of the former Directors who, among much else, carried the reputuation of gas into the countryside. Of industrial relations, the Chairman said he looked upon the problem as one of the human being as such. Work should have a dignity of its own, apart from the weekly pay packet. If a man were regarded, or regarded himself, merely as a number or a cog in a machine, he would not be happy. The Board was, he hoped, approaching the subject with understanding and imagination.

Engineers' Guild

The fifth luncheon of the metropolitan branch of the Engineers' Guild, held at the Chez Auguste Restaurant, Frith Street, W.1, on May 18, was well attended by members and guests. These luncheons—which are held four times a year between October and May—have been very well supported. The average number was about 50 and on one occasion 85 attended. It was hoped that ultimately they would reach the 100 mark.

The Chairman mentioned, for the information of the guests, that these luncheons were held not only to allow civil, mechanical, and electrical engineers to get together and discuss Guild matters, but also so that guests who were interested in the welfare of the profession as a whole, could discuss their problems with Guild members.

It had been decided to hold the luncheons in future on the second Wednesday in October, December, February and April.

Focus on Coal Research

B.C.U.R.A. LUNCHEON and OPEN DAY

It is appropriate that while interest is still focused on the annual report and accounts of the N.C.B. (on which we comment in our leading columns today) another most important aspect of the coal industry's activities comes into the limelight. We refer to the open day and luncheon of the British Coal Utilisation Research Association at the Leatherhead Research Station on June 13, which was honoured by the presence of the Rt. Hon. Philip Noel-Baker, M.P., Minister of Fuel and Power.

RECURRENT fuel crises have made clear to industrial and domestic consumers that the development of improved methods of using coal is an essential factor in our survival as a nation. Much has been done by combined effort to achieve fuel economy; still more will be achieved under the spur of rising costs. The work of B.C.U.R.A.—an autonomous association representative of the nationalised coal industry, makers of coal burning appliances, coal distributors and consumers, assisted by the D.S.I.R.—will therefore commend itself to all who are concerned with achieving the more efficient use of the nation's principal natural asset.

It is fitting that there should be occasions such as this open day when much can be seen and learnt of the important research work which is continuously proceeding at Leatherhead. The Director-General, Dr. D. T. A. Townend, his staff, and indeed all concerned are to be congratulated on the most admirable arrangements made for the comfort and interest of upwards of 300 members and guests on this occasion. Nothing was left undone to make clear by word of mouth from expert guides and by printed explanations attached to the various pieces of apparatus and equipment the object of the researches being carried out on steam raising plant, furnaces, gas producers, and domestic appliances to name but a few of the Association's many activities.

Covering an area of 20 acres, the Leatherhead site was acquired in 1943—five years after the formation of the Association—and now houses a staff of well over 200. As research develops so extensions have been added to the buildings, and the end of this year will see the completion of yet another building for full scale plant research. With a length of 250 ft. by nearly 60 ft. wide, it will be the second largest on the site and will be devoted to domestic appliances, which section has hitherto been conducted in temporary laboratories at Pebble Coombe. In future the latter, a century-old mansion on the famous Box Hill ridge about six miles away, will be used entirely as a staff residence.

As a footnote, it may be mentioned that the Leatherhead Research Station is a large consumer of gas—not only in connection with actual research and experimental work, but in almost every laboratory it is gratifying to see instantaneous gas water heaters.

The Luncheon Speeches

Presiding at the luncheon, which was held in the completed portion of the new building just referred to, was the President of the Association, **Sir Charles Ellis,** F.R.S., who was supported by the Vice-President, Sir John Charrington, by Lord Hyndley, Chairman of the N.C.B., and by many distinguished guests.

Sir John Charrington proposed the toast of 'The Guests,' which was responded to by the Minister of Fuel and Power.

Mr. Noel-Baker said we were using coal at the rate of 2,000 million tons every decade, 20,000 million tons every century, with the certain knowledge that our resources must be finished within a definite period of time. The chemists has found out how to make many things, but had not yet found out how to make coal. B.U.C.R.A. existed in order to teach people how coal could be better used. We must create next winter's supplies ahead of ouf needs; the right time to face the coal problems of next winter was now. We must do everything in our power to ensure that stocks were adequate and that our current output of coal would then be high. Stocks today were 900,000 tons higher than a year ago, in spite of the fact that April and May were much colder. But the increase above last year must be very much more than that.

Output in great measure must depend on man-power. The Government had made great efforts over the last six months to support the Coal Board to stop wastage of men and increase their numbers. Those efforts had notably succeeded, and they would not be relaxed. But the long-term problem of British coal was the efficiency with which we used it. British wealth, British industrial greatness, the British Commonwealth, our world-wide trade, had all been built on coal. They all still depended absolutely and almost completely on coal.

'Your predecessors,' continued the Minister, 'have done splendid work but have not had enough support. In the work of your Association you have, I am sure, the maximum support of the National Coal Board, and I pledge you here and now, for this Government and for all coming Governments, the maximum support of the Ministry of Fuel and Power and the Government as a whole.'

Unique Association

Dr. Harold Hartley, proposing the toast of B.C.U.R.A., said the Association became unique when the majority of the original subscribers, abolished by Act of Parliament, were replaced by a national organisation. The experiment in nationalisation which was being carried out in this country had presented the statesman, the administrator, and others with new problems. These national organisations were of great magnitude, and the mere fact of 'bigness' created its own peculiar difficulties and presented dangers which, if not realised, might grow insidiously. A nationalised undertaking lacking the stimulating effects of competition might develop an attitude of self-sufficiency and might become a social juggernaut smashing everything which got in its way—

(*Concluded on p. 869*)

Inspecting a laboratory unit pulveriser at the Leatherhead Research Station of B.C.U.R.A., Professor H. W. Melville, F.R.S., and Dr. Harold Hartley, the 'Visitors' appointed by the D.S.I.R.

Midlanders Go South

Chairman's and Ladies' Day at Oxford

FOR the first time since the former Midland Association of Gas Engineers and Managers was founded in 1877, ladies were invited to the summer meeting of the Midland Section of the Institution of Gas Engineers at Oxford on June 15. So cordial was the response that about 80% of the members attending brought their wives to what was in all respects a very enjoyable gathering, favoured with summer weather at its best. The Midland Section draws most of its members from the East and West Midlands areas, but the frontiers of the area boards and the district sections of the Institution are not co-terminous, and what at first view looked like an invasion by Midlanders of the territory of the Southern Board was in fact quite a legitimate visit to the Chairman's division within the section's own boundaries.

The visitors assembled in the morning at the gasworks, the ladies being promptly conveyed to Therm House—the fine modern building in the city centre devoted to showrooms, demonstration theatre, homecraft centre, and offices, while members looked round the works, with particular attention to the section on the south bank of the Thames, which was under construction when the Midland Association last visited Oxford 26 years ago. After the war the former Company put forward proposals for an extension of the south works, and although the scheme was approved by the Ministries of Fuel and Power and of Local Government and Planning it was turned down by a Select Committee of the House of Lords. Negotiations are now in progress with the City Council and the Oxfordshire County Council for a site at Cowley on which it is proposed eventually to construct a completely new works.

The parties rejoined for luncheon at the Randolph Hotel as guests of the Southern Gas Board. Speeches were commendably brief and the timetable was observed with great precision.

General Well-Being

Mr. J. H. Dyde, President of the Institution of Gas Engineers, proposing the toast of the Southern Gas Board, said it was evident that, as ladies were present for the first time in 73 years, nationalisation had produced rationalisation. The Southern Board was fortunate in embracing the ancient and lovely city of Oxford and some of the environs of the old Midland Association, and in having among its members Mr. S. E. Whitehead (Deputy Chairman), a past President of the Institution, past President of the old Southern Association, and also closely connected with the Midland Association, and Mr. Rex Chester, one of whose missions in life was to encourage gas engineers to make their gasholders 'a thing of beauty and a joy for ever.' As for Mr. Owen Guard, Chairman of the Board, he was always cheerful and smiling and that, he believed, represented the general well-being of the Southern Board, its staff, and its employees throughout.

Two points had impressed him about the Board's first report. The first was its emphasis on decentralisation and the delegation of authority to the local man, leaving the Board free to deal with matters of policy and finance. Mr. Guard was the creator of that policy, which was reflected in the fact that the headquarters staff comprised only 16, and that the divisional staff in each of the four divisions numbered only 13. The other outstanding thing in the report was the progress shown by the Board in extending the advantages of seaborne coal, bringing it over long distances by lorry from the excellent port facilities which existed on the south coast.

A Grim Outlook

Mr. O. R. Guard, Chairman of the Southern Board, in reply, said that quite frankly he thought they had got a pretty sticky time coming. They fully realised that the needs of the re-armament programme must come first, and that might well mean a re-orientation of a lot of their ideas and a re-modelling of all their long and short term plans, and that, to many, particularly engineers, would be a serious blow, and give rise to the danger of creating a sense of frustration. He urged them, however, not to be beaten by conditions which were not only national but international. It was to such an Institution as theirs that they had to look for men of skill and determination to ride right over the problems that beset them. He had worked closely with Mr. Alexander Tran, their Chairman, for two and a half years; he had not only been a loyal colleague, but a good friend, and he wished to thank him for his service to the consumer, to the Board, and to him personally, and to wish him a very successful year. Finally on behalf of the Board he expressed pleasure at the large number of members and their ladies who had accepted their invitation to that function.

Alderman Mrs. F. M. Andrews, Deputy Mayor of Oxford, in the absence through illness of Alderman W. O. King, the Mayor, proposed the toast of the Midland Section and referred to the strides which had been made in the gas industry since the foundation of the old Association in 1877. She paid warm tribute to the work of Mr. Tran since his appointment at Oxford in 1940. His loyalty to his work and his affection for his fellow men had been a source of inspiration to all the employees and all who had come into contact with him. The City Council appreciated the co-operation it was receiving from the Southern Gas Board and from Mr. Tran in the very difficult matter of the ultimate removal of the gasworks from its present site, in the interests, she emphasised, of better planning. The Board and its Chairman had shown an outstanding example of public spirit and broad vision in acceding to the Council's views on the question of better planning. Naturally the Board had to impose safeguards and make stipulations, and the complete removal would not be effected for some years, but a start was to be made in the near future. A venture of such magnitude would not be possible without a proper relationship and understanding between the Board and the City Council and their respective officials.

Mr. Alexander Tran, Chairman of the Midland Section, in responding, said he counted it a compliment to the section and to himself as its Chairman that so many important people had attended. At the same time there were some whose absence was regretted, and among those who had sent apologies he mentioned Mr. C. H. Chester (Chairman, South Western Gas Board), Mr. H. F. H. Jones (Chairman, East Midlands Gas Board), Mr. G. E. Currier (Deputy Chairman, North Eastern Gas Board, and Senior Vice-President of the Institution), Mr. J. S. Smith (Ministry of Fuel and Power), and Dr. W. T. K. Braunholtz (Secretary of the Institution). Credit for the success of the day's programme was, he said, due to the staff of the Oxford undertaking and members of his own divisional staff.

Afternoon Visits

After luncheon one large party made a tour of the colleges under the guidance of members of the English Speaking Union, and another paid an interesting visit to the Cowley works of Morris Motors, Ltd. Most of the components of cars are made at Coventry and Birmingham. At Cowley the various parts are marshalled around assembly lines and built up into finished cars and vans, which go out to every part of the British Isles and to export markets throughout the world. The works tour ended with tea at the works, thanks being expressed by Mr. Tran. The tour of the colleges was followed by a return to Therm House where tea was provided by the Southern Gas Board, for which thanks were expressed by Mr. J. E. Wakeford, Senior Vice-Chairman of the Section. The full day's programme ended as it had begun, with a re-union at the gasworks from which the visitors departed by their several ways.

London and Southern Section Summer Meeting

The summer meeting of the London and Southern Section of the Institution will be held at Watford on July 4 by invitation of the Eastern Gas Board.

Commencing at 10.30 a.m., there will be alternative visits in the morning to the Watford gasworks or to Sun Printers, Ltd. After luncheon at 1 p.m. in the Small Town Hall, Watford, there will be further alternative visits to St. Albans Abbey, to Verulamium, or to the St. Albans gasworks with a return to Watford for tea at 5 p.m. Coaches will be available for all visits.

First Time in 63 Years

Eastern Section Visits Lowestoft

Mr. T. C. Battersby Succeeds Mr. H. H. Redwood as Chairman

THE first annual general meeting of the Eastern Section of the Institution of Gas Engineers—successor to the 63 years old Eastern Association of Gas Engineers and Managers—was held at the Royal Hotel, Lowestoft, on June 11 and 12 under the Chairmanship of Mr. H. H. Redwood (Newmarket). There was a record attendance both at the business meeting and at the social events, which comprised the annual golf competitions, reception and dance, a coach tour, and a visit to the Co-operative Wholesale Society's canning factory. At the end of a successful year Mr. Redwood handed over the Chairmanship to his successor, Mr. T. C. Battersby, General Manager of the Watford Division.

Councillor W. H. Amy, J.P., Mayor of Lowestoft, extended a cordial civic welcome to the Section at the opening of the business meeting, remarking that the Borough was proud to be honoured by the holding of the meeting there during Festival of Britain year. It was, he said, the first time in the long history of the former Association that Lowestoft had been selected for such a meeting.

The Chairman suitably returned thanks and welcomed on the platform Mr. J. H. Dyde, President of the Institution of Gas Engineers and Deputy Chairman of the Eastern Gas Board, and Mr. G. E. Currier, Senior Vice-President and Deputy Chairman of the North Eastern Gas Board. Among those who sent apologies were Colonel H. C. Smith, Deputy Chairman of the Gas Council, who was abroad, Sir John Stephenson, Chairman of the Eastern Gas Board, Mr. H. F. H. Jones and Mr. Sydney Smith, Chairman and Deputy Chairman of the East Midlands Gas Board, Mr. R. N. Quirk and Mr. J. S. Smith, of the Ministry of Fuel and Power, Mr. S. E. Whitehead, Deputy Chairman of the Southern Gas Board and a former colleague of the Chairman of the Section, and Mr. R. H. Epps, Secretary of the Eastern Gas Board, who was attending a meeting of Area Board secretaries at Southampton.

One new member was elected—Mr. J. P. Warwick, of Thomas De La Rue & Co., Ltd.—and he and Mr. K. L. Clark (London), elected at a previous meeting, were welcomed to the meeting. On retirement from the industry, the meeting accepted with regret the resignation of Mr. A. Spencer (Saxmundham), a member since 1922.

Strengthened Structure

The Chairman gave a report as the Section's representative on the Council of the Institution. In his view the conversion of all the affiliated District Associations in England and Wales into District Sections of the Institution had strengthened the structure of the Institution and forged a more personal link between the Institution and its members. Mr. Redwood also referred especially to the invitation received by the Institution from Colonel H. C. Smith to provide a technical advisory service, for which purpose a panel of experts had been set up; the retirement from the Gas Education Committee of Mr. John Terrace; the progress made by the Gasworks Safety Rules Committee, and the opening of the Institution headquarters in Grosvenor Crescent.

Officers for 1951-52 were elected as follows: Chairman, T. C. Battersby (Watford); Senior Vice-Chairman, F. A. Rhead (Peterborough); Junior Vice-Chairman, Bernard Clarke (Lincoln); members of Management Committee, E. H. Winch (Cambridge) and R. C. Wardell (Boston), to serve for two years, and W. A. Evetts (Watford) to serve for one year. The Chairman said that 85% of the members had returned ballot papers, and on his suggestion thanks were expressed to the scrutineers, Mr. W. J. Collins Garrard and Mr. F. Allen.

'Something Done'

Mr. R. J. Gavin (Royston), proposing the adoption of the annual report already circulated, said the change from District Association to District Section had been effected so imperceptibly that members were inclined to accept the fact without realising the immense amount of work and organisation necessary to enable the Section to run smoothly during transition period. On behalf of the members he expressed appreciation of the work the Chairman and the Committee had accomplished and congratulated Mr. J. Hunter Rioch, the Hon. Secretary, on 'something attempted, something done' in his usual accomplished manner.

As indicated in the report, he (Mr. Gavin), as Hon. Secretary of the Education Committee, endeavoured to keep abreast of developments affecting the Institution education scheme. The Eastern Section had a very scattered district with educational facilities few and far between, and his task had generally been concerned with the arrangements necessary for the examination of gas fitters under the City and Guilds scheme. Ordinary national certificate courses in mechanical engineering were being run in several colleges in the district, to name a few—Lincoln, Norwich, Ipswich, Bedford, Luton, Chelmsford, Colchester, Cambridge, Stamford, and Peterborough—but no college in the area ran gas engineering classes. Of course, the ordinary national certificate in mechanicals was an appropriate and accepted preliminary course whereby students at technical colleges might study for the new Associate Membership examination.

So far, very few applications had been received from the area in connection with the initiation of higher national certificate courses in civil engineering with gas subjects, though the number might grow as time went on. It was doubtful whether there would be many, if indeed any, colleges in the area able to provide such a course, in which case the student would require to sit for the higher certificate in mechanicals and thus obtain a large measure of exemption from the Associate Membership examination.

The future of the district education committees had been the subject of consideration by the Gas Education Committee recently. It had been decided to retain the district gas education committees in being for the present, since the area boards had not finally decided the procedure whereby they would implement the requirements of Section 4 of the Gas Act, 1948. Some area boards were proposing to use the existing district committees without modification of their constitution, while others were proposing to set up education committees with much wider terms of reference, or to leave the administration in the hands of the education officer. So far as the Eastern district committee was concerned, the matter was still under consideration.

Mr. W. Morland Fox seconded the adoption of the report and congratulated the Management Committee on the smooth change over.

On the proposition of **Mr. R. A. Weston** (Norwich) the accounts for the six months ended December 31, 1950, were adopted.

The meeting confirmed the appointment of Mr. Battersby as District Member of the Council of the Institution and re-appointed Mr. H. R. Wimhurst and Mr. A. W. Mather as Auditors.

Mr. Redwood then delivered his Chairman's Address, which will be published later.

A Source of Satisfaction

Mr. E. H. Winch (Cambridge), proposing a vote of thanks for the address, said it was a source of satisfaction to the members that one who had served the old Association for so long and so well as Hon. Secretary and Treasurer should have been the first Chairman of the Section. The transition from Association to Section had not made it easier to prepare a Chairman's Address, and the industry was still passing through a phase of re-organisation and change. The senior executive of a gas undertaking no longer had a domain which was quite as exclusively his own as in the past from which to relate experiences and problems and methods of overcoming them, or to give details of extensions and future planning. There was all the more reason for congratulation on the subjects which

Mr. Redwood had selected and the sentiments he had expressed, and the courageous way in which he had led their thoughts on the future. If they wanted a motto it would be difficult to find one more suitable than that which Mr. Redwood had quoted: 'We look back with pride, and forward with resolution.' It was that spirit that had brought the industry and the Institution to the position they occupied today.

The reorganisation made available resources for training of personnel which were denied to many undertakings in the past, and education and training of employees formed an essential part of advancement, not only in efficiency but in the service which they could render to the community. Mention had been made of the late Mr. Troughton, known and respected by many of those present. Could he have been with them that day he was sure his heart would have filled with pride to know that the traditions that he established not only in the Newmarket undertaking but in the meetings of the old Association were being so ably maintained by the present Chairman.

Mr. Bernard Clarke (Lincoln), seconding, remarked that in stressing the liaison existing between the Section and the Institution the Chairman had inferred the very great responsibility which devolved on every one of its members. He welcomed the emphasis which he had laid on education and welfare and believed that only so long as they upheld the traditions of the past could they hope to advance the professional standard of the industry and its service to the community.

The Chairman briefly acknowledged the vote of thanks.

Next came a discussion on the safety recommendations issued by the Institution, opened by Mr. T. C. Battersby and wound up by Mr. Dyde, President of the Institution. Our report of the discussion is held over.

Finally, **Mr. Redwood** introduced Mr. Battersby as Chairman of the Section and wished him a happy and successful year of office. He had, he said, served a successful apprenticeship as first Chairman of the London and Southern Section.

Mr. Battersby briefly replied and proposed a vote of thanks to Mr. Redwood for his services during the past year.

The meeting was followed by the official luncheon, at which there was an attendance of just under 200.

New Premises Planned

Mr. R. A. Weston (Norwich) proposed the toast of the Borough of Lowestoft, coupled with the name of the Mayor, to whom he introduced the members as 'a cross-section of the gas industry and its contractors from an area stretching from Grimsby to Watford and from Bedford to the east coast.' After reviewing the long history of Lowestoft and its quarrels with neighbouring Yarmouth, he said the Eastern Gas Board had succeeded in bringing the two towns together under the group management of Mr. J. H. Greenacre, and hoped in the not far distant future to build new premises on the site of the bombed showrooms and offices of the old Lowestoft Gas and Water Company.

The Mayor (Councillor W. H. Amy, J.P.) responded and spoke with pride of the town's many achievements and attractions. Having spoken of Lowestoft's part in the war he presented to the Chairman and the Secretary copies of 'Port War,' an illustrated account of the Borough and its sacrifices from 1939 to 1945.

Mr. F. A. Rhead (Peterborough) proposed the toast of the guests, among whom he mentioned the Mayor and Mayoress, Mr. F. B. Nunney (Town Clerk), the President and Senior Vice-President of the Institution, Mr. G. Davies and Mr. R. W. Hilham (President and Secretary of the Eastern Junior Gas Association), Mr. A. G. Higgins (Assistant Secretary of the Institution), the ladies, and representatives of Lowestoft industries.

Mr. J. H. Dyde responded in a humorous speech.

Mr. C. E. Grimwood, Immediate Past Chairman, proposed the toast of the Chairman, to which **Mr. Redwood** replied.

Golf Competition

The annual golf competitions were played over the course of the Lowestoft Golf Club, Pakefield, on the Monday, the winners being: Turner Trophy, L. F. King. George Wright Cup, J. Simpson. Competition: (1) C. A. McLeod. (2) J. Hunter Rioch. (3) C. Byrt. (4) T. C. Battersby.

The trophies were presented by Mrs. Redwood at the reception held at the Royal Hotel in the evening, when a large and colourful gathering was welcomed by the Mayor and Mayoress, the Chairman, and Mrs. Redwood. After the presentation of the golf prizes, Mr. Redwood voiced the thanks of everyone present to the Mayor and Mayoress; musical honours were accorded, and the Mayor made a brief reply.

After luncheon on the Tuesday, members and their ladies had the choice of a coach trip round the Broads and a visit to the canning factory of the Co-operative Wholesale Society at Lowestoft. Both parties returned to the Royal Hotel for tea, and the proceedings ended with final expressions of thanks to all who had made the occasion so enjoyable and successful.

FOCUS ON COAL RESEARCH — Concluded from p. 866

and that would be disastrous. A benevolent attitude was preferable.

The official connection which Professor Melville and Dr. Hartley had with this Research Association had given them the privilege of enquiring into the details of its activities in their financial, administrative, and practical aspects; of visiting the Research Station and asking the Director the why and wherefore of the methods of organisation; of questioning the leading members of the staff about the nature and the merit of their work; or making comments and of having those comments examined and criticised. His respect for the Association had grown as he had acquired better appreciation of the merit of the work that was being done and of the scientific approach of the staff to the problems with which they dealt. The background research was of a high order, and in the past it owed much to that loveable and quite exceptional man, Dr. Bangham. It was being developed actively by his successor, who had many years of experience of this organisation. As an industrialist, Dr. Hartley was prepared to give the scientist his head and to provide him with the necessary means for his work; but from time to time they must have a reckoning to try to see what was being obtained for the effort expended. If that test be applied to the work of this Association it would be found that things were going well.

With that toast it was their desire to couple the name of the President of the Association, Sir Charles Ellis. Dr. Hartley did this with the greater pleasure because of Sir Charles' scientific attainments and his personality. He impressed as a man who, having a wide knowledge and experience in scientific matters, directed his efforts to see that every promising avenue for research should be explored. As Scientific Member of the Coal Board, he had the responsibility of seeing that utilisation research was prosecuted in the best possible manner. As the years passed they would be able to see in its real perspective the wisdom of the union he had inspired of the N.C.B. with a research association.

Coal Science Lecture

Replying to the toast, **Sir Charles Ellis** thanked Dr. Hartley for the kind references he had made to himself and to the staff. They appreciated them the more because they knew on what intimate knowledge of the Association they were founded. They owed Dr. Hartley and his colleague, Professor Melville, a great deal. They were the Association's visitors, appointed by the D.S.I.R., and they had devoted a great deal of time to examining this establishment. Dr. Hartley's words came from a great industrialist who himself controlled the difficult interplay of research, development, and manufacture—and had done this successfully through many years.

Sir Charles went on to say that at their annual meeting he was privileged to announce the establishment of an Annual Coal Science Lecture to be given by their Medallist. This, he thought, was an innovation for any research association, but they had the encouragement of the D.S.I.R. in doing this. The idea of this lecture was to mark permanently their recognition that all genuine technical progress had its foundations in scientific knowledge. The Association had asked Sir Alfred Egerton to be the first Coal Science Lecturer and Medallist, and they were greatly honoured that such a distinguished scientist should inaugurate the Lecture. Sir Charles paid tribute, in conclusion, to the Director-General and his staff. It was they who did the work. It was they who were the team which was establishing the standard of achievement and of quality of work which put them in the forefront of research associations. To them he would say 'Thank you and good luck' and would wish them the best of fortune in the coming year.

MANAGEMENT AND PLANNING

Chairman's Address

of

T. C. BATTERSBY,

General Manager, Watford Division,
Eastern Gas Board.

Presented at the Spring General Meeting of the London and Southern Section of the Institution of Gas Engineers on May 22

IT may be fortuitous, but I think it is distinctly to our advantage that all our members are drawn not from territory coincident with the boundaries of one area board, but from several, and with the addition of the few members not directly employed by the nationalised industry the Section thus enjoys contributed papers and an interchange of views which mirror experiences gained under widely differing conditions. Naturally there is a great diversity of interests among the technicians who serve our industry, and this will increase as integration creates a demand for specialists in an industry hitherto regarded as peculiar to the gas engineer.

Management

In varying degrees management is exercised by most of us in the course of our daily duties. Management may be defined as 'all those activities involving responsibility for the work of others.' The term embraces a very wide range from the most senior official down to a foreman or chargehand, but I propose to confine these remarks to management as a function of professional employment.

Very few, if any, entrants into the industry have the specific intention of becoming managers. The channels through which the individual approaches managerial responsibilities in the gas industry are possibly less varied than in other industries, but nevertheless without any common educational background. Of those exercising managerial functions today, the majority acquired qualifications as engineers, a few as chemists, accountants or secretaries, and at the time intended to follow a career along professional lines, but subsequently, either by choice or by enveloping responsibilities, find themselves almost predominantly occupied with management. A few others have forsaken specialised employment in a large undertaking, and accepted appointments combined with managerial duties in a small one. Each in his professional capacity has found opportunities for promotion, either within the undertaking or by transferring his services from one undertaking to another, the successive appointments offering greater scope for the professional ability and imposing progressively heavier managerial responsibilities.

Thus it may be said that the majority have acquired their knowledge of the principles of industrial organisation and management by general experience. Their success has been measured by their professional competence and displayed common sense. These were considered reasonable criteria for assessing the art of conducting human systems of co-operation, and I would not for a moment wish to detract from the skill in management displayed by so many gas engineers, because it is only by their hard work and foresight that the industry has achieved its present enviable position in the industrial life and economy of the community. In fact, this well-tried system, with such variations as circumstances demand, may persist in the future, but I incline to the opinion that in this fast moving and revolutionary age, the process of learning could be speeded by the acceptance of management as a theoretical study; not, of course, in substitution for practical experience, but rather as the complement to it.

Before the war, some technical colleges were providing classes to cover the varying requirements of professional bodies for the instruction of their student members in management subjects. In 1945 the Minister of Education appointed a committee to consider the problems of education for management, and in the terms of reference the Committee was asked to pay special regard to the requirements of professional organisations. Finally, this Committee, under the Chairmanship of Lieut.-Col. Urwick, with the assistance of several professional bodies, made a report which was subsequently approved by the Minister.

The Committee expressed the view that management knowledge, as distinct from any detailed understanding either of the processes of the particular industry or of the various services and skills which are themselves indispensable tools for the conduct and regulation of a complex organisation, should enable its possessor:—

(*a*) to determine the immediate and long term objectives of the whole or of any part of the undertaking;
(*b*) to judge readily the significance and the comparative importance of the varied advice which he receives;
(*c*) to appreciate the contribution which the expert, whether as an individual or in combination with others, is able to make;
(*d*) to know how to use each contribution effectively; and
(*e*) to integrate these several abilities so as to ensure the most appropriate action.

In some degree, this body of knowledge has to be applied to every task involving the control of other people.

The Committee concluded that theoretical study alone could not make a manager, but that his success would depend upon his innate qualities, his acquired knowledge, his experience under competent guidance, and his ability to combine these elements into a balanced whole. However, for part of the preparation for managerial responsibilities, educational facilities were considered desirable.

As the gas industry was constituted prior to vesting, it secured for itself through its thousand-and-one separately controlled undertakings a succession of trained and experienced managers, but today, with the trend towards integration and functionalism and the employment of specialists for each department of our activities, the opportunities to gain co-ordinating experience are less apparent, particularly for those who seek training in general management. When we consider the nature and complexity of the problems which confront the industry today, it is not to be expected that one individual in his lifetime could assimilate all the skills employed to meet them. He should, however, acquire a sufficient understanding of each to enable him to attach to every factor its due weight and significance, and sufficient appreciation to direct skilled assistance effectively.

Is this another sphere in which the Institution might be able to assist the young engineer, by including administration features in an advanced educational syllabus? Not necessarily as a further section added to the Sections "A" and "B" of the Associate Membership examinations, but rather as a study to be undertaken at a subsequent date when the young engineer has acquired a more mature appreciation of the problems of the industry. I would not suggest that it is necessary to design a syllabus to meet the specialised demands of the gas industry, but I consider it might be possible to adapt a syllabus to a common curriculum such as is already available in many technical colleges. One professional institution has for some years included industrial administration in its educational syllabus, and if the training of our young people were put on an equally broad basis, it would afford the members of the Institution an opportunity to equip themselves for the highest administrative posts the industry can offer.

Legislation and Development

In our professional, as well as in our private lives, we endeavour to keep within the law, but it is generally acknowledged that this has become increasingly difficult, and unfortunately ignorance of the law is not accepted as a reasonable excuse for its non-observance. The Gas Act is perhaps the focal point of our professional interest in legislation, but in recent years other Acts have been introduced which directly affect the gas engineer, as those who are concerned with the erection of plant or the disposal of gasworks effluent must well know. Throughout the country the demand for gas is steadily increasing, and must be met either by the expansion of existing works or by the building of new ones, but the Town and Country Planning Act of 1947 has materially restricted the freedom of action hitherto enjoyed. Even if the selected site had been scheduled by Parliament for the manufacture of gas, the final arbiter today is the Minister of Local Government and Planning, who, after consultation with the Minister of Fuel and Power, may say what plant shall be erected and how it shall be disposed; and in practice his decision would appear to be final.

Those of us who have sought authority to expand a works or to build a new one have been brought forcibly to realise that while many people may prefer gas for certain domestic purposes, and industrialists may choose it for their heat requirements, the intention to manufacture gas in proximity to their homes or factories will be strenuously resisted. Any project which aims to produce, in their midst, the gas requirements of a distant community, intensifies the opposition, and unfortunately this attitude strikes at the very roots of integration and the economic advantages which would accrue. I am inclined to the view that this reaction of the public towards our industry is not adopted without some justification. The conditions in and about many works leave much to be desired, and our support for the aims of the Smoke Abatement Society is not always exemplified in our own practices.

It would be palpably unfair to place the blame on our predecessors for all the difficulties which today confront us, and in any case they did not live in such an amenity-conscious age. All round us we see evidence of the higher standards of living which the country is rightly striving to provide for the lower wage groups. This is symbolised in the attractive housing estates which are being built in the rural and urban areas to accommodate the spillage from the more densely populated towns, and the construction of a gasworks in the vicinity of such neighbourhoods is regarded by many planning authorities as a retrograde step. The sources of nuisance complaints to which we are heirs are generally associated with old works, and unfortunately by these standards our future intentions are judged.

In most cases the site for the gasworks was selected because it was relatively low-lying and conveniently placed for the reception of coal by either land or water transport. If, at that time, the works was sited on the outskirts of the town, this fact was probably quite incidental, and the conditions which arouse so much criticism today did not deter builders from developing the surrounding area as the population expanded.

Judged by present-day amenity standards many of the daily operations on a works do engender neighbourhood nuisance complaints, but these should not be regarded as the inevitable accompaniment of gas production. Conditions on many works can be improved by totally enclosing the dusty and odorous operations, by fitting dust arresters and by introducing suitable mechanical devices for the handling of raw materials and products. I am conscious that the industry is aiming at higher standards, and I am sure that where the opportunity arises to build new works our engineers will be able to demonstrate that despite our age we are as modern as time, and thus avoid the unenviable reputation of lacking social conscience.

The attitude of the public towards our industry was forcibly impressed upon me when the Eastern Gas Board sought planning consent to develop its St. Albans works. Although the County Planning Authority gave its approval to the project, subject to the observance of certain conditions, the scheme aroused considerable local opposition. At a public inquiry, where inspectors of the Ministries of Local Government and Planning, and Fuel and Power presided, the City Council sought to show that the existing works should not be expanded because *inter alia* the surrounding area was now mainly residential, and they argued that several alternative sites were more suitable for the additional plant. These suggested alternative sites are at the present time on the outskirts of the town, and herein undoubtedly lies their present attraction, but this may not always be so; in fact, one cannot visualise acres of land in the vicinity of a gasworks being sterilised for all time. If for a decade these isolated sites should offer unhampered freedom to conduct our processes with something approaching a *laissez-faire* attitude, it is inconceivable that the amenity aspect will not ultimately assert itself, and time show that instead of resolving the problem its solution had only been postponed.

Subject to the existence of reasonably good foundations and the avoidance of tall structures in aircraft corridors, there is no insurmountable engineering difficulty in building a gasworks almost anywhere, and it is rather for speed of construction, and economic reasons, that we are concerned to satisfy ourselves that the selected site has:—

(1) good facilities for the transport of materials, either by land or water,
(2) an abundant supply of water for process purposes,
(3) ample facilities for the disposal of effluent liquor,
(4) adequate labour resources conveniently available,
(5) a good geographical relationship to the centres of existing and potential gas demands.

These essentials were to be found, or at a cost could be made available, on some of the proposed alternative sites, but our investigations and estimates revealed that the erection of approximately 15 mill. cu.ft. per day of gas-manufacturing plant, with the necessary extensions and modifications of the existing distribution system and the installation of additional compressing plant would incur serious delays and involve the Board in capital expenditure and operating costs far in excess of the sums required if the equivalent capacity of production plant were installed on the St. Albans works which was already planned to receive this development.

It is not my intention to express my personal views on the decision reached by the Minister of Local Government and Planning after he had weighed the evidence submitted at the enquiry. I have cited the case so that we may consider the lessons to be learned from such an experience:

(1) In the preliminary investigations it became abundantly clear that many of the powers exercised under Private Acts, and subject only to Regulation 56-A of the Defence (General) Regulations had been abrogated by the Town and Country Planning Act.

(2) It was quickly realised that the time required to obtain planning consent can seriously delay the start of development and expansion programmes.

(3) That increased regard must be paid to the preservation of local amenities because a small minority can excite sufficient support to oppose any project which does not conform to their æsthetic standards.

(4) If the attitude of the vast majority of the public is somewhat apathetic towards gas plant in general, a gasholder is an anathema to everyone outside the gas industry, and storage sites have to be very carefully selected.

(5) We must endeavour, with the assistance of experienced architects, to eliminate the hard industrial features of our buildings. I do not mean that we should make every retort house a replica of the Taj-Mahal, and I do not think we are expected to do so, but an acceptable balance must be sought between utilitarian and embellished design.

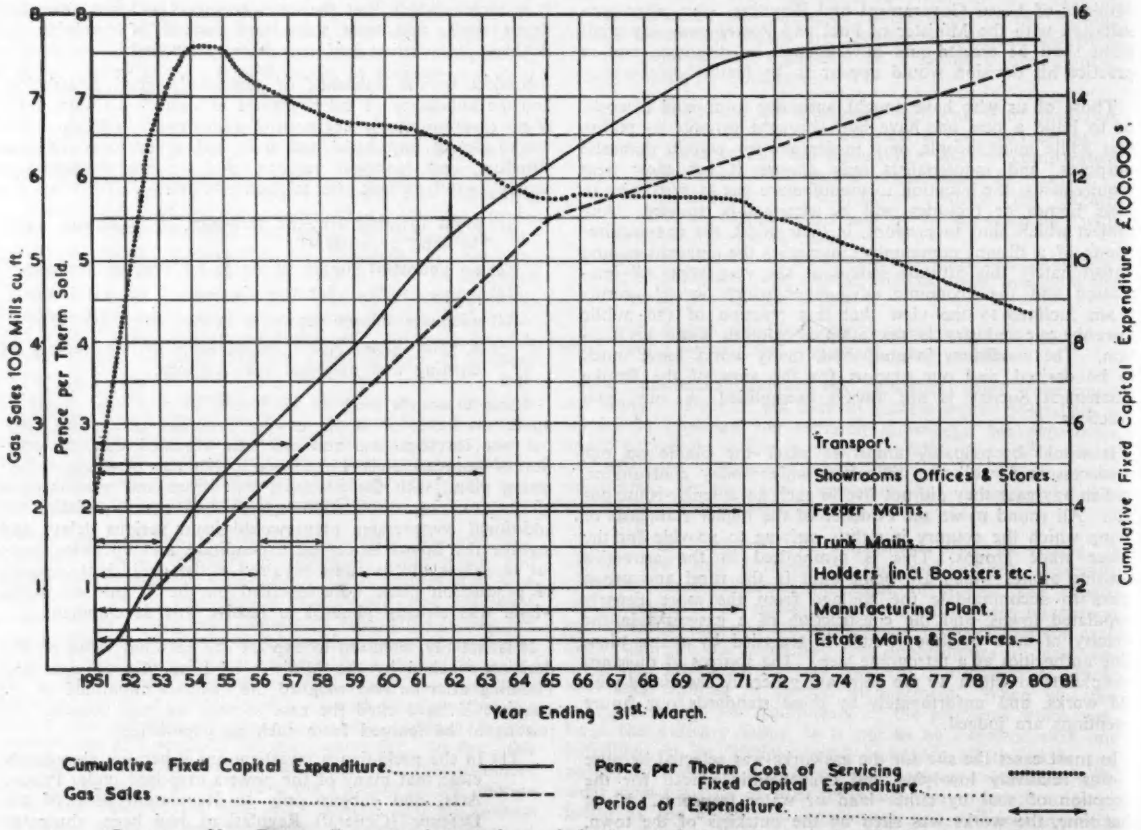
(6) That adverse criticism can be assuaged and higher æsthetic standards achieved only at an extra cost which ultimately must be borne by the gas consumer. The planning authorities in general appreciate our problems, and it is our duty in every way practicable to assist them and those upon whom Parliament has placed the burden of matching those two irreconcilables—æsthetic and economic values.

If the Town and Country Planning Act has introduced machinery which involves us in protracted negotiations before consent to develop a works can be obtained—and this I think can be countered only by consultations and discussion with the appropriate planning authority as soon as a project is envisaged—by the same Act our distribution problems are less obscure, as this year the county authorities are required to submit to the Minister development plans and development programmes and we shall know where and to what extent an area may be developed, but these plans are subject to revision at least once in every five years. No doubt every planning authority is looking ahead as far as it is reasonably practicable to do so, but circumstances change so rapidly that it would be unwise to conclude that plans based upon the best information available today will reach maturity in 20 to 30 years' time without some variation. In the Watford division a very large increment of population has been planned, but we are conscious of the element of risk which arises, at least in so far as the development towns are concerned, for in addition to many other factors, their growth depends upon the attractions they can offer to industry and the voluntary migration of population from the congested centre of London.

The question of costs generally is one of considerable concern, because not only are manufacturing, distribution, and management costs rising, but capital costs are greatly in advance of those obtaining in pre-war days. The capital servicing of these costs—that is to say, the depreciation and interest to be provided—has, of course, to be reflected in the price of gas. In the Eastern area, with its new towns and its L.C.C. estates, considerable capital has to be made available, and I think it will be of interest to you to see how far the depreciation and interest costs which will arise in such cases, affect the future availability of gas supplies.

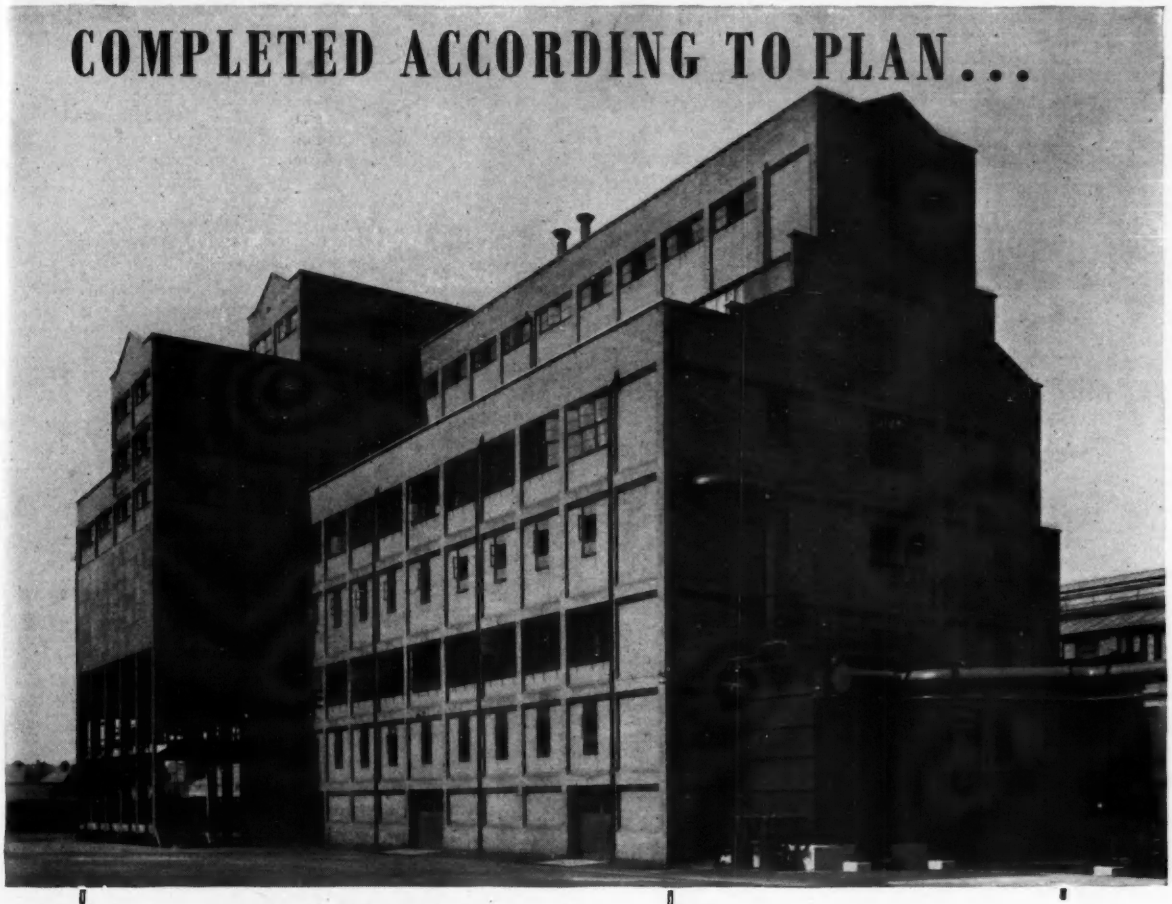
I have taken as a specific example the Stevenage New Town, as it typifies the immediate burden of new business. The town will have a well-defined industrial zone, separated from the commercial and residential areas by the railway and the Great North Road. The gas will be supplied from existing works in adjacent towns, which will be expanded as the demand for gas increases.

(*Concluded on p. 884*)


Gas Sales 100 Mills cu. ft.
Pence per Therm Sold.
Cumulative Fixed Capital Expenditure £100,000's.
Transport.
Showrooms Offices & Stores.
Feeder Mains.
Trunk Mains.
Holders (incl Boosters etc.).
Manufacturing Plant.
Estate Mains & Services.
1951 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81
Year Ending 31st March.
Cumulative Fixed Capital Expenditure.....
Gas Sales.....
Pence per Therm Cost of Servicing Fixed Capital Expenditure.....
Period of Expenditure.....

Stevenage New Town.—Forecast of gas sales and fixed capital expenditure during development period.

COMPLETED ACCORDING TO PLAN...



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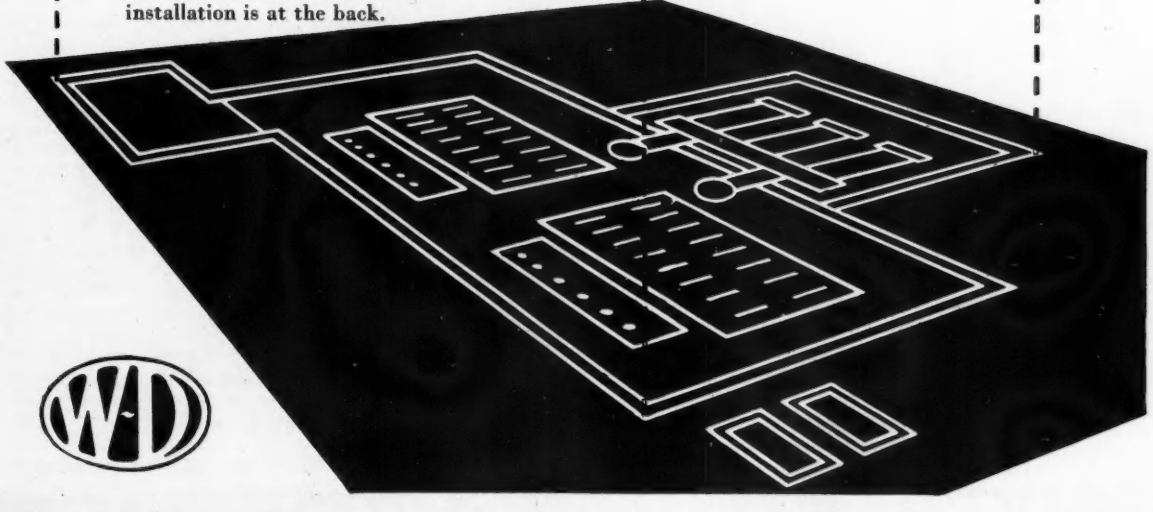

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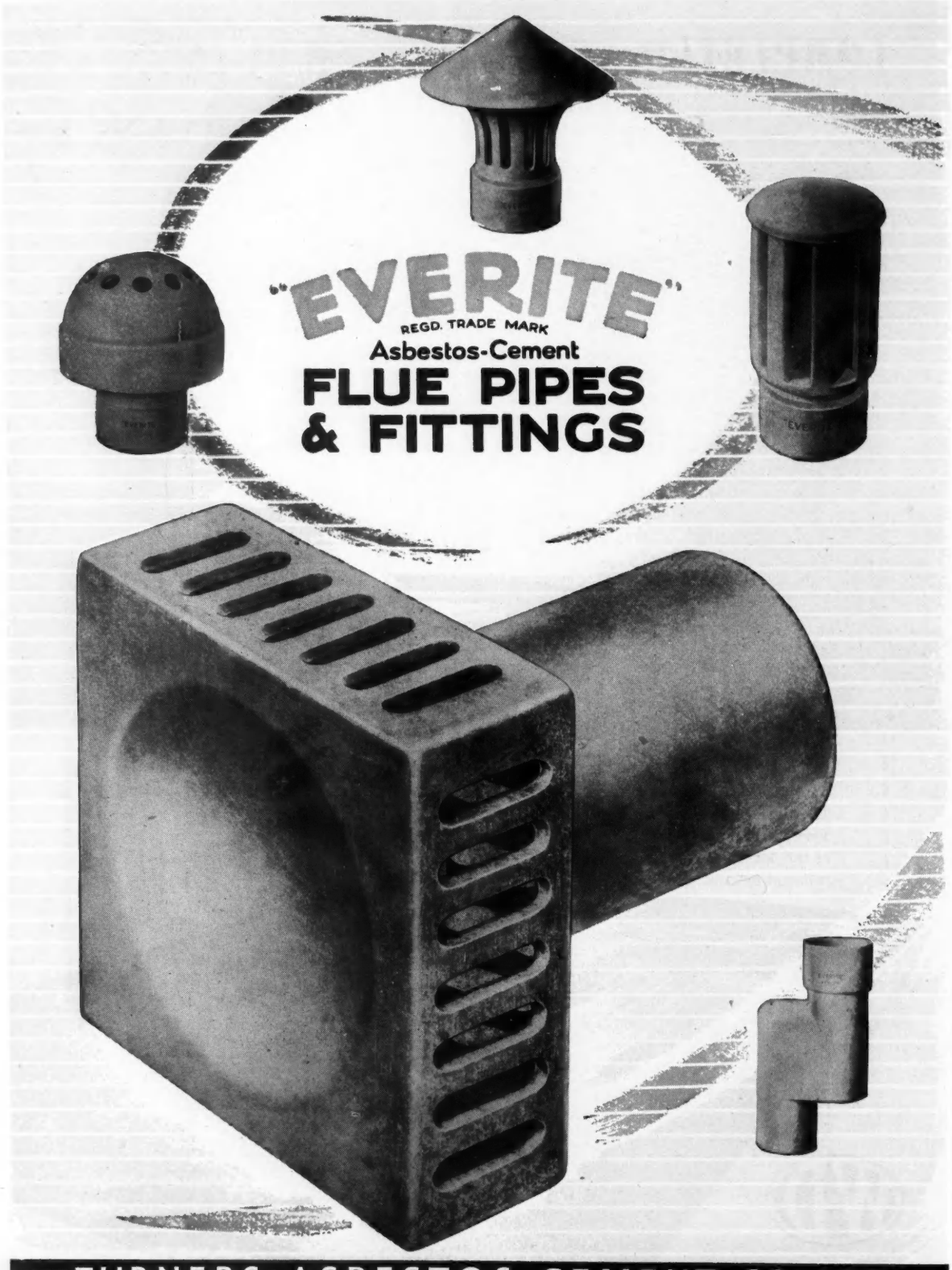

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The Rating of Domestic SOLID FUEL APPLIANCES

By

F. J. EATON, Ph.D., B.Sc., M.Inst.Gas E.,

Coke Development Officer, North Thames Gas Board.

Rating is a method of expressing appliance performance and is used to determine the size of appliance necessary for a given heat service. The subject is a wide one and includes the calculation of heat requirements of buildings as well as appliance design and its influence on performance. This paper deals first with the application of the well established rating of boilers to central heating practice and proceeds to advocate the adoption of a single value (instead of the present three) for the rating of hot water boilers. A basis of rating is proposed for openable stoves and the many variants of the open fire.

THE development of domestic solid fuel appliances has now reached the stage when further progress is largely dependent on 'rating,' which may be defined as the classification of appliance performance. Rating is not new; it has been used in connection with central heating and domestic hot water supply boilers for many years; indeed, it was in 1911 that a committee of the Institution of Heating and Ventilating Engineers decided that 4,400 B.Th.U. per sq. ft. of heating surface per hour was a reasonable figure on which not only to compare one boiler with another but, more important, on which to base calculations of the size of boiler required to heat a building to a desired comfort level.

From this brief statement it will be clear that rating is a very wide subject involving a knowledge of the science of heating and ventilation as well as of appliance testing and performance. The boiler makers of 1911 were most enlightened and far-sighted men, for it is only within the last year that their example has been followed and serious attempts have been made to fix the rating of domestic heating appliances such as heating stoves and the many modern variants of the open fire.

In approaching the subject of rating it is possibly easier to start with the central heating boilers and to examine how far the principles applied in the design of heating systems for large buildings can be adopted for the smaller scale, but similar problem, of domestic heating. I therefore deal with central heating boilers first, and this section includes most of the heating and ventilating considerations which are essential to rating. It will be apparent that there are too many gaps in our knowledge of rating; but even in its present incomplete state, I believe it can make a substantial contribution to the vital present-day problem of domestic fuel economy. It is not sufficient to design a domestic appliance with a high test bench efficiency; the heat output must be capable of being used effectively, and the control must be sufficiently flexible to meet the varying needs of a domestic heat service. Many of us feel that flexibility is more important than high overall efficiency, particularly in view of the rapidly extending use of multi-duty appliances providing space heating and hot water supply. Rating provides the yardstick for the proper assessment of these factors, and indicates the direction in which improvements in design are needed.

Appliance Testing and Performance

Appliance testing and the accumulation and examination of performance data are an essential part of rating, and it will probably be helpful first to review the work which has been done in this field before dealing with other aspects of rating which are still the subject of discussion. The gas industry first became interested in domestic coke appliances some 30 years ago. Testing methods were evolved which not only helped in the immediate problem of the design of coke burning appliance but provided data on which performance standards could be based.

Not all of the performance data were from laboratory tests; much came from examination of appliances in the home or factory—in other words, from field tests. The analysis and consideration of critical dimensions of appliances together with field tests can reduce considerably the work involved in appliance approval, since only those appliances which depart from proved acceptable design require to have a performance test. The gas industry through its direct contacts with the public is in a most favourable position to obtain field test data, and in making full use of this facility the coke appliance designer is simply following the good example of his colleague on the gas side. By 1937 sufficient data had been accumulated to make possible the compilation of a Handbook of Approved Coke Burning Appliances[1]; this was issued under the auspices of the London and Counties Coke Association in 1938; it was revised and reprinted in 1942. A further edition was issued in 1948 by the National Federation of Gas Coke Associations, and the task of revising and keeping the Handbook up to date is now the duty of the Gas Council Coke Technical Committee. It will, I am sure, be appreciated that the collecting of all the data necessary for the Handbook could not have been accomplished without the active co-operation of the appliance makers.

Before leaving this subject I would emphasise that the compilation and issue of the Handbook marked an important advance in the direction of improved appliances in that to be included a fixed minimum standard of performance had to be reached. Further, these minimum standards marked the first step towards appliance rating.

It very often happens that a development project, in which progress has been all too slow for those engaged in it, suddenly begins to move towards its goal more quickly because of help received from development in kindred subjects. Domestic appliance development and, indeed, the much wider subject of house heating received such help and stimulus from Post-War Building Study No. 19, Heating and Ventilation, better known as the Egerton Report, which was published in 1945. In this report the three stages necessary for the development of appliances are stated as follows[2].

'The problem of meeting the needs of appliance manufacturers who will have to make improved appliances, and of housing authorities who will have to choose and install

them, falls naturally into three stages. The first stage is the clear statement and general acceptance of the requirements which need to be fulfilled. The second stage is to set up some organisation for the authoritative and impartial testing of newly-developed and improved appliances in order to enable manufacturers to organise their production programme as soon as the seal of approval is set on a new proposal. The last stage is to provide the necessary safeguards for the purchaser, so that he can specify appliances having the required performances with the assurance of getting an article which will be adequate. This last stage would naturally fall into the scope of the British Standards. . . .'

The Domestic Fuel Policy Report (Simon Report) issued in 1946 actively supported these views and in connection with stage two recommended[3]:

'The Government should be responsible for ensuring the proper type testing of appliances, and the organisation should be rapidly developed to enable them to perform this work without causing delay to manufacturers in introducing new appliances.'

Such an organisation was set up under the Ministry of Fuel and Power in 1946, and the test schedules and standards of performance then prepared and issued to manufacturers are now being revised, and it may be considered that only minor alterations, if any, will be required for many years. The impetus given to development by the Ministry scheme has been a major factor in the progress made in the design and installation of better solid fuel appliances in recent years. Further, the big increase in appliance testing has made it possible to obtain in a comparatively short time sufficient data on which to base the next stage of development—namely, the classification of improved appliances according to the function they can best perform. The gas coke interests have taken an active part in all this work much of which was initiated for coke appliances many years ago, but it is important to recognise that without the Ministry scheme progress would have been much slower.

Rating of Central Heating Boilers

The present accepted rating figure for all sizes of central heating boilers is 4,400 B.Th.U. per sq. ft. of heating surface per hour (sq.ft. H.S./hr.). This figure was fixed first for the larger boilers by the Boiler Rating Committee of the Institution of Heating and Ventilating Engineers in its report published in 1911. At some later stage it was accepted for the smaller domestic range of heating boilers. The following extract from this report is instructive on the complexity of rating:

'The Committee fully recognised the difficulty in fixing upon a basis of rating which would be absolutely fair for all types of boilers. To do this would involve extensive tables fixing the emission power with different rates of combustion. Such tables were considered and strongly advocated by some members of the Committee. The value of such information was admitted, but it was felt by the majority that such tables would be too elaborate for general catalogue purposes, involving as it would a very considerable series of tests of every type of boiler.'

Such a series of tests has, as far as I am aware, never been carried out, and it has become the practice to allow for variations in boiler design by making a percentage addition to the connected load heat requirement when calculating the required boiler power. This percentage addition may be considered as an appliance factor, but before dealing with this I would remind you of the procedure for calculating the connected load heat requirement.

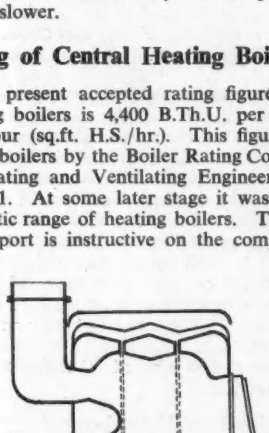
The first step is the calculation of the hourly heat loss (H) for the building to be heated. This is expressed thus in the Egerton Report[4]:

Equation (1) $H = (A_1 . U_1 . T_1 + A_2 . U_2 . T_2 + \ldots Va . Ta \times 0.019)$ B.Th.U./hr.

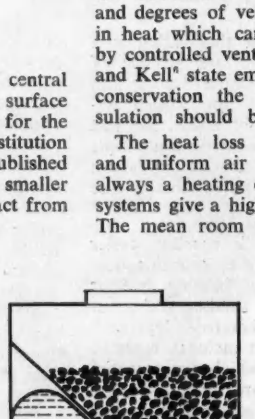
where A_1, A_2, etc. = areas of walls, windows, floor, etc. (sq.ft.).
U_1, U_2, etc. = thermal transmittance values appropriate to the areas A_1, A_2, etc. (B.Th.U./hr.)
T_1, T_2, etc. = difference in temperature on two sides of A_1, A_2, etc. (°F.).
Va = volume of ventilating air (cu.ft. per hour).
Ta = difference of temperature between inside and outside (°F.).

The values of U and Va are best obtained from 'A Guide to Present Practice' issued by the Institution of Heating and Ventilating Engineers. The Guide gives different values of U for each outside wall construction depending on the degree of exposure and orientation. It is most instructive to make the calculation of H assuming different wall constructions and degrees of ventilation and to note the very large savings in heat which can be effected by structural insulation[5] and by controlled ventilation. On the subject of insulation, Faber and Kell[6] state emphatically: 'In the interests of national fuel conservation the construction of new buildings without insulation should be prohibited.'

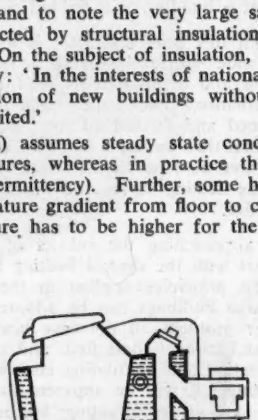
The heat loss value (H) assumes steady state conditions and uniform air temperatures, whereas in practice there is always a heating cycle (intermittency). Further, some heating systems give a high temperature gradient from floor to ceiling. The mean room temperature has to be higher for the same



HEATING BOILER
I.A.



GRAVITY FEED BOILER
I. B.



AUTOMATIC BOILER
I.C.

Fig. 1

comfort standard, and this leads to higher heat losses[7]. The second stage of our calculation introduces these factors and gives the heat requirement (HR).

Equation (2) $HR = H\left[\frac{1+(IF+GF)}{(100)}\right]$

IF = intermittency factor (%).
GF = gradient factor (%).

For low rooms GF is small and may generally be neglected. IF, on the other hand, is large and may exercise a controlling influence on the amount of heat loss. Very full accounts of the reasons for intermittency will be found in Faber and Kell[8] and the I.H.V.E. Guide[9]. The Egerton Report[10] after discussing the effect of intermittency of heating up time, occupational period, heat capacity of wall linings and appliance flexibility, gives a table of figures for daily periods of occupation from two to 15 hours, but it is specifically stated 'these figures can only serve as a rough guide.' Clearly as far as domestic dwellings are concerned further data are needed, and at present the big gaps in our knowledge of the intermittent heat requirements are reflected in the large margins allowed in heating calculations.

The final stage in our calculation of boiler power (B.P.) is given by:

Equation (3) $B.P. = HR + CL\left[\frac{1+(AF)}{(100)}\right]$

where HR = heat requirement (B.Th.U./hr.).
C.L. = circulation losses—*i.e.*, from connecting pipes (B.Th.U./hr.).
Note: HR + C.L. = connected load.
A.F. = appliance factor (%).

Appliance Factor and Appliance Design

The appliance factor is closely related to appliance design and particularly to the overload of which the appliance is capable—in other words, its flexibility. When dealing with large cast-iron sectional central heating boilers a usual margin or appliance factor is 25%, and when intermittency is added the value may be 33-50%, depending on the thermal capacity of the structure, the desired heating cycle, and the type of heating system. If a gravity feed boiler with its greater flexibility is used, the appliance factor is *nil*. It appears reasonable to assume that the same principles apply to the smaller domestic boilers. Thus the sectional boilers of the type shown in Fig. 1(a) should have a boiler margin of 25% and no margin need be added for the gravity feed boiler Fig. 1(b). Fig. 1(c) represents a relatively new type of boiler in which the fuel rests on a solid hearth, air is blown through the fuel bed by a fan which is thermostatically controlled, and the removal of ash depends on the formation of clinker. This involves a very careful choice of area of the combustion zone in relation to boiler output. It has not, so far as I am aware, been established what margin is appropriate to these boilers.

(a) From the regression the combustion rate per sq.ft. of grate area per hour is 6.1 lb. with a range from 4.9 to 8.0 lb./sq.ft.GA/hr., and
(b) the refuelling period is every five hours with a range from every four to every six hours.

It is considered that a good standard of performance can be obtained on the type of boiler shown in Fig. 1a when designed to give a re-fuelling interval of every six hours and a combustion rate at rated output of about 6 lb./sq.ft.GA/hr. Lower combustion rates are not of special advantage unless coupled with an increased fuel capacity. Such considerations lead naturally to a gravity feed boiler. This boiler has high flexibility and is able to operate satisfactorily at an overload of 170%.

Most small cast-iron sectional boilers of this type have sufficient fuel capacity to permit re-fuelling every six hr. at at rated output. Under average winter conditions re-fuelling need not be more frequent than every 12 hr.

Domestic Hot Water Supply Boilers

Like heating boilers, hot water supply boilers are rated on heating surface. The British Standard[11] specifies a continuous rating of 6,000 B.Th.U./sq.ft./hr. for all types of domestic boilers and a rating for short periods at high output, of 10,000 and 11,000 B.Th.U./sq.ft./hr. for the open and closed type boilers respectively. A slightly lower rating is given to the open type boiler since the provision of the front fire door lowers the proportion of its heat output in the form of hot water. In the many discussions on the transmission power of boiler heating surfaces it has often been argued that a fixed value is unfair and restricts progress. This criticism is justified when the appliance has a secondary heating surface, but our many tests on the simple 'pot' boiler, where all the heating surface is direct, show that any slight departure from straight sides which can be made does not materially improve the performance and is generally not worth the extra constructional costs. On the other hand, the rating is very closely related to the conditions of usage which must be carefully specified. Thus the higher figures given above, called the normal domestic ratings, assume a re-fuelling period of every two hours, while for the lower value the re-fuelling period is every six hours.

Prior to the British Standard of 1937 a number of domestic boilers were given outputs based on a rating of 15,000 B.Th.U./sq.ft./hr. Such a rating can, of course, be obtained, but it would be necessary to re-fuel and clean the fire every 20 to 30 min., and it is fairly certain that clinker would be produced at this high rate of burning. Such a high rating is obviously unsuitable. The re-fuelling period at each rating is thus of special importance, and in the revision of the British Standard now in progress, consideration is being given to increasing the two-hourly re-fuelling time to 2½ hours. Such a change may prove to be a fairer method of ensuring an adequate fuel capacity than by specifying a dimensional standard of capacity which makes no allowance for the more efficient boiler.

Performance of Domestic Boilers

When the rating of domestic hot water supply boilers is discussed it is generally pointed out that the higher rating figures bear little relation to average domestic usage conditions, and the word normal is a misnomer except to indicate that this is the rating adopted by manufacturers for catalogue purposes. At the 10,000 B.Th.U./sq.ft. HS/hr. the minimum sized 2 sq.ft. heating surface boiler will require to burn about 3 lb. of coke per hour. Under such conditions the average hot water efficiency on coke is about 50%. To obtain more information of the performance of domestic boilers we have at Watson House been carrying out what we call practical usage tests. We are making increasing use of such tests in our examination of appliance performance. The boiler in the practical usage test is connected by short unlagged flow and return pipes (total length 22 ft. diam. 1¼ in.) to a lagged indirect cylinder of 27 gal. actual capacity. Each test lasts 96 hr.; a standard hot water draw-off schedule is carried out during the day, and the boiler is banked overnight. The long-period test is required for two reasons—first, to try to simulate domestic conditions where ash accumulates and has to be removed from the fuel bed and, second, to obtain a reasonably accurate fuel consumption figure. Typical test figures are as follows:

DOMESTIC BOILER. OPEN TYPE. 2 sq. ft. HEATING SURFACE.

Fuel consumption (Coke) ...	112 lb./week.	0.67 lb./hr.	
Hot water at tap		440 gal. at 140° F.	
Water temperature in cylinder	average	130° F.	
Room temperature	,,	67° F.	
Chimney draught	,,	0.02 in. W.G.	
Flue gas temperature ...	,,	303° F.	

HEAT DISTRIBUTION.

	%
Hot water at tap	25
Radiation and convection from boiler surfaces ...	26
Heat loss from hot water system	
(*a*) Storage cylinder	7
(*b*) Flow and return pipes	12
Ash-pit loss	2
Flue loss and unaccounted for at boiler	28
	100

Consideration of these test results shows that the domestic boiler, although primarily intended for hot water supply, does in fact give more of the heat of the coke in the form

of space heating. This is equally true for all solid fuel appliances giving domestic hot water. The additional space heating is most valuable in the substantial contribution it makes to house heating, indeed J. C. Weston[13] states: 'The results from Abbots Langley show that water heating accounts for more than half of the heat gains in most houses.' It is also clear that when space heating is not required, as for example in summer, it is desirable to use gas for water heating.

The figures given in the above table show the heat distribution under the conditions of providing the equivalent of 440 gal. of hot water per week at 140°F. It is appreciated that this quantity of hot water is greatly in excess of the figure of 250 to 350 gal. generally associated with the supply of hot water from a solid fuel domestic boiler. With the boiler used in this test it was not possible to operate at a lower combustion rate and be certain that the fire would remain alight. Hence the effect of a smaller hot water demand will be to raise the average water temperature in the storage cylinder and circulating pipes, and this will still further increase the space heating output. More recent tests with a different boiler have shown that an average fuel consumption of 0.55 lb./hr. can be maintained over 12 hours with no domestic hot water being drawn off.

The results of the practical usage tests can now be applied to the subject of rating domestic hot water supply boilers. The fuel consumption of a domestic hot water boiler of the 2 sq.ft. heating surface size is likely to be of the order of 0.5 to 0.7 lb. per hour which is very much lower than the 3 lb. per hour required at the rated output of 20,000 B.Th.U./hr. It is closer to the 1¼ lb. per hour required by the 6,000 B.Th.U./sq.ft. HS/hr. rating. Now this latter figure[13] is used for the larger boiler supplying domestic hot water for blocks of flats, office blocks, factories, etc., and it would tidy up the position if it could be adopted for the smaller domestic boilers also.

I am well aware of the difficulties of making this change. All boiler makers' catalogues would require to be altered, and this would be a major change covering a considerable number of years, as catalogues are re-issued less frequently to-day than they have been in the past. Further, it may be argued that purchasers have become accustomed to the higher rating figures and would be confused by the issue of lower values for the same size of boiler. On the other hand, the use of the 6,000 B.Th.U. rating for all types of domestic hot water supply boilers would have the great advantage of standardising the procedure of calculating the size of boiler, and the equally important size of storage vessel, required to give a satisfactory hot water service, and for these reasons alone I would advocate that the rating should be on the basis of 6,000 B.Th.U./sq.ft. HS/hr.

Calculation of Boiler Size and the Storage Capacity

The Code of Practice on Centralised Hot Water Supply which has just been issued contains a table of constants[14] to be used for the calculation of the boiler size and the capacity of the storage cylinder. The procedure used may be expressed by the equation:

$$\text{B.HS.} = \text{BP}\ \frac{(1{,}000 + \text{HCL})}{6{,}000}$$

where B.H.S. = Boiler heating surface (sq.ft.).
BP. = Boiler power. (Gallons per person per hour from the Table.)
HCL. = Hourly circulation losses.

A further figure of storage capacity in gallons per person is also provided for each class of building. Figures are given for dwelling houses of medium and high rental and for flats of low, medium, and high rental—dwelling houses of low rental are treated separately. Let us now consider the hot water installation for a medium rental house (950—1,500 sq.ft. floor area) and assume a family of four. The calculations give the size of the boiler required as heating surface 2.5 sq.ft. with a storage cylinder of 40 gal. capacity. This storage cylinder size agrees with the recommendations of the Egerton Report but is considerably larger than that normally installed.

In many pre-war houses in the London area, the domestic boiler installation included a hot water tank usually unlagged of 25 gal. nominal—*i.e.*, 21 gal. actual capacity. This tank would correspond to British Standard size 2.2. The hot water service from such an installation is poor, and the need to 'race' the boiler to get rapid recovery of hot water supply often results in the formation of clinker and certainly leads to fuel waste. For the low rental houses the Code of Practice[14] recommends a storage vessel of 34 gal. actual capacity "to enable 3 gal. of hot water to be drawn off at the kitchen sink at a temperature of not less than 140°F. immediately prior to two baths being taken in succession." From our practical usage tests with a storage cylinder of 27 gal. actual capacity two baths each of 25 gal. at 110°F. can be obtained in succession—*i.e.*, the second, 20 min. after the first—and this is considered to be a satisfactory service.

The two advantages of the smaller size of storage cylinder are, first, lower capital cost and, second, less waste when summer hot water is obtained by alternative fuels. For low rental houses I would suggest a minimum size boiler of 2 sq.ft. heating surface and a lagged hot water storage vessel of about 27 gal. actual capacity. This boiler would be capable of the performance recommended in the Code of Practice[14]—*i.e.*, the water heater to be capable of heating the effective contents of the storage vessel from 50°F. to 150°F. in four hours while heating at the same time the other connected loads such as a towel rail.

Heating Stoves

The manufacturers of heating stoves generally give the output either as B.Th.U. per hour or as volume of space which can be heated. It is impossible to obtain a true comparison of the heat output of different heating stoves, as the method of test and the details of the test fuel used are not stated. Hence, whenever a heating stove is to be installed it is advisable to consult the manufacturer, who can advise which of his range of sizes can best provide the heat service required.

Several attempts have been made to standardise the rating of heating stoves. A number of manufacturers wished to introduce this when a British Standard Committee was set up in 1936 to consider the installation of heating stoves with special reference to fire precautions and regulations. Again, a further committee set up in 1945 considered, but could not agree on, rating. In the Handbook of Approved Coke Burning Appliances we adopted the principle of giving the test performance on coke and also the manufacturers figure for the volume of space which could be heated satisfactorily. For the heating stoves listed the heat output amounts to 2.2 to 3 B.Th.U. per cu.ft. of space heated.

In contrast to our slow progress in standardising a method of rating heating stoves, the Dutch have developed a most comprehensive testing and approved scheme. All heating stoves are tested by the Instituut Voor Warmite-Economie and are required to give a net efficiency (100% flue loss) of not less than 80%. In addition, the combustion at rated output must not exceed 8.0 lb./sq.ft.GA/hr., and the fuel capacity must be such that, over a period of 40 min. to ignite the fresh coal (generally brown coal), together with the 2½ hour test period, the CO_2 content of the flue gases must not fall below half of the maximum value observed in the test.

The Institute ensure that production models can give the required performance by making tests on random samples taken from manufacturers stock, and further tests are made on appliances which have been in use for a reasonable period. The scheme is supported by the manufacturers who pay for the tests. The whole scheme has proved most successful, and the public have become so keenly interested in efficiencies that purchasers always ask what the efficiency figure is and consider it in relation to the price and appearance. In doing this they are of course helping themselves, for it is the custom in Holland for the tenant to provide the heating stove which thus becomes an important part of the household effects. It would be difficult to adopt this practice in this country, partly for economic reasons but mainly because of the added complication of the water connections from the back boiler. The

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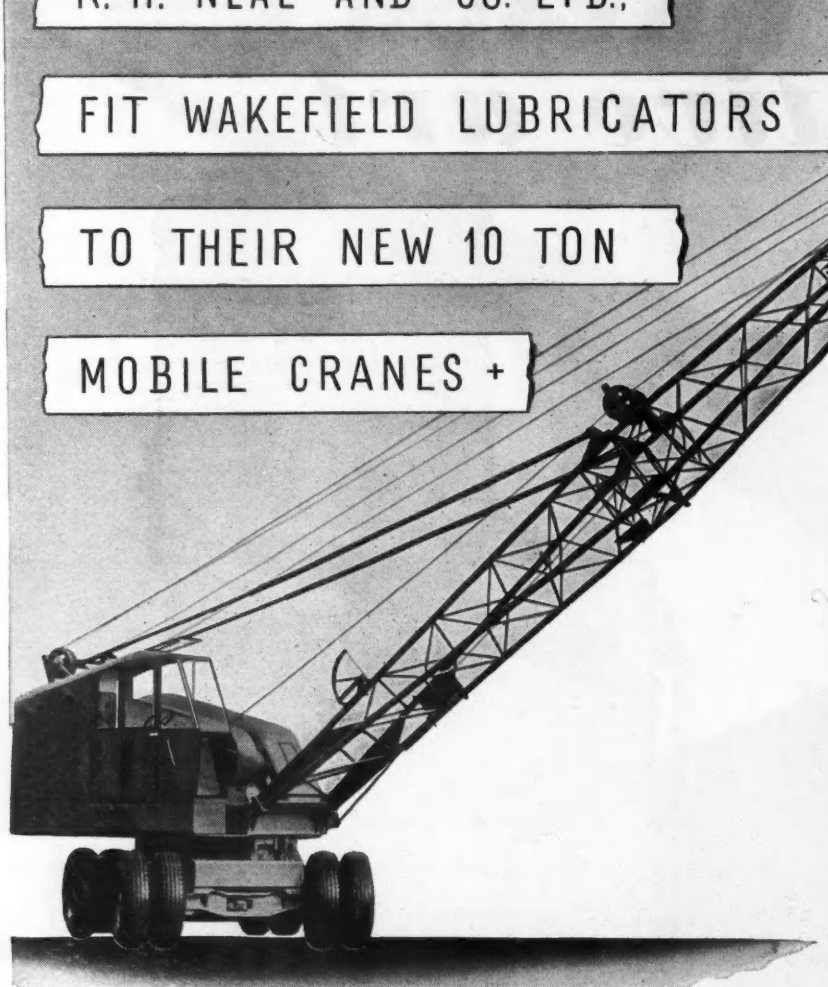

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position is simpler in Holland as the stove is used to provide space heating only and water heating is mostly by gas appliances.

The tests made by the Instituut provide an efficiency figure and the heat output. Until recently the size of stove required was calculated by using a figure of 5 B.Th.U./cu.ft./hr. This figure has now been found to be too low and has been increased to 6 B.Th.U.

The progress made in standardising test conditions and test fuels by the Ministry of Fuel and Power and the general acceptance of the Ministry's test schedules now provide a method of determining the output of heating stoves under comparable conditions. It is likely that coke will be selected as the test fuel for the purpose of rating. By suitable selection the quality of coke can be maintained within close limits, and it is easier to obtain repeatable test results with coke than with other fuels. The selection of the test coke is mainly determined by the coal carbonised, as this affects the ash content and combustibility, but carbonising conditions are also a factor, particularly if the test coke is obtained from a non-base-load plant.

Stove Size and Heat Service

It has already been mentioned that for some of our stoves an hourly heat output of about 2.5 B.Th.U. per cu.ft. of room space is allowed, whereas the Dutch figure is now 6 B.Th.U. This big difference obviously requires further investigation. I give below the calculation of the heat requirements of a through living room 22 ft. × 11 ft. × 8 ft. 6 in. such as might be found in a house of about 950 sq. ft. floor space and from this, using the procedure adopted for sizing central heating boilers, proceed to determine the heat required from a heating stove to provide a room temperature of 65°F.

HEAT REQUIREMENTS LIVING ROOM 22 ft. × 11 ft. × 8 ft. 6 in.

Item	Area sq. ft.	U value	Heat Required B.Th.U./hr./°F.
Outside walls	127	0.2	25.4
Windows	60	1.0	60.0
Floor	242	0.15	36.3
Ceiling	242	0.1	24.2
Doors and partition walls ...	77	0.17	13.1
Ventilation	volume	0.02	82.3
	2 × 2,057		
Steady state loss ...			241.3

In making this calculation the following assumptions have been made: (i) the outside walls are insulated; (ii) there is no heat flow through the party wall to the living room of the adjoining house; (iii) the kitchen backs on to the living room and is at the same temperature; (iv) the rooms above and the hall which adjoins the living room are at a temperature higher than the outside air and by taking one-third of the actual U value provides a suitable allowance for this higher temperature; and (v) the ventilation rate is represented by two air changes. All of these assumptions emphasise the complexity of heat requirement calculations, how much is left to personal experience, and how necessary it is to have a standard procedure. For the selection of appliances a standard procedure is essential, and I would urge the preparation of such a standard at an early date.

We now have to decide the design temperature difference. For this I have taken a figure of 35°F. since in Chapter VIII Code of Practice[17] the standard of heating for appliances with low-temperature radiation is given as 63°-67°F. The mean of 65°F. less an assumed outside air temperature of 30°F. gives the design temperature difference of 35°F.

It will be remembered that in the discussion of heat requirements in connection with central heating boilers increments were required for intermittency and temperature gradient, and in the final calculation an allowance was made for the flexibility of heat output which I called the appliance factor. These increments apply to all calculations of heat requirements, but are in some ways more complex for normal central heating practice because of the greater variety of heating systems. In domestic heating, conditions are likely to be more constant, and the calculations can be simplified by the use of a composite factor dependent on the type of appliance used; this could be called the appliance factor, although it would have a different meaning to the same term applied to central heating practice. The magnitude of this appliance factor has to be assessed, and further experiments are required to determine the true value. In this connection the work of J. C. Weston and his collaborators at the Building Research Station and the data they are collecting on house heating at Abbots Langley and elsewhere are invaluable.

Temperature Gradient

The type of heating obtained with an openable stove operated with doors closed is similar to that obtained with a hot water radiator[18] and tends to produce a similar temperature gradient. At present I have an openable stove in my office, and this gives a temperature gradient floor to ceiling of 18°F. when the temperature at breathing level—*i.e.*, 5 ft.—is 65°F. By opening the doors as is usual when the living room is occupied, the temperature gradient is altered to 11°F. The higher temperature gradient with the openable stove implies that to obtain a comfortable temperature the room has to be at a higher average temperature than would be the case with an open fire appliance with its greater high-temperature radiation output. A heating stove should have a higher temperature gradient factor than an open fire.

Intermittency

Heating stoves are intended to be operated continuously. Under banked conditions of firing the combustion rate on coke can be as low as ½ lb. per hour, which at a combined space heating efficiency of 40%, as determined by our test method, gives a heat output of about 2,500 B.Th.U. per hour. The domestic heating cycle will still prevent the heat loss from reaching the steady state, but the heating up period required to reach comfort level will be less than that for the open fire which is lit each day.

From the above considerations and from examination of the intermittency and temperature gradient factors used for other forms of heating, I have assessed the appliance factor as 15% and believe this to be the minimum increment that could be allowed. The heat requirement of our through living room on this basis is therefore:

$$241.3 \times 35 \ (1 + .15) = \text{approx. } 9{,}700 \text{ B.Th.U./hr.}$$

This output can easily be supplied by a small openable stove without back boiler, and a similarly sized stove with back boiler would also be satisfactory. With both types, however, the convected warm air must be discharged into the living room as the radiant heat output would only meet about two-thirds of the calculated heat requirements. It has been clearly shown from field tests that where the convected heat is ducted away and reliance is placed on the radiation from a stove the room heating is unsatisfactory.

The room selected for our calculations has a volume of 2,507 cu.ft. and the heat requirements therefore amount to 4.7 B.Th.U./cu.ft./hr. I would again stress that this value depends very largely on the many assumptions made and that further data are required from heating tests to prove the reliability of these assumptions. Once this has been done, I believe it possible to reduce the calculations to the use of three figures covering the different house constructions of (i) traditional, (ii) insulated, and (iii) insulated with wall lining. I am encouraged in this belief by the very great simplification which J. C. Weston[19] has shown to be possible in his recent paper dealing with the heat requirements of houses of widely differing constructions.

Open Fire Appliances

There is at present no standard method of rating solid fuel open fire appliances and the practice is to install either a 14, 16, or 18 in. fire according to the size of room. No allowance is made for any structural insulation, wall lining, or ventilation, and it is common to find a 16 in. fire installed in rooms varying in size from 100 to 250 sq.ft. floor space. The public are accustomed to the poor standard of heating provided by the open fire and by force of habit move closer

to or further away from the fire according to the room conditions. After all, even a small fire can give the necessary warmth provided you get close enough to it!

It is proposed that the rating for open fire appliances should be similar to that for openable stoves and should be the heat output obtained under the standardised test conditions of the Ministry of Fuel and Power schedules. In applying the open fire rating to heating problems, however, adjustments are necessary for (a) increased radiant heat output, (b) increased ventilation, and (c) the intermittent operation of the open fire when compared with the openable stove. Code of Practice C.P.3 Table 2[20] recommends the following standards of warmth for heating system in living rooms:

	1. High temperature radiant source	2. Other systems of heating
Air temperature °F. ...	58—62	63—67
Surface temperature °F. ...	58—62	—
Unidirectional radiation B.Th.U./sq. ft/hr. ...	40	—
Mean radiant temperature...	—	66—70

From these recommendations it seems desirable to base heat requirements on a design temperature rise of 30°F. and 35°F. for the open fire and openable stove appliances respectively. In the calculations for openable stoves a ventilation equal to two air changes per hour was assumed. The ventilating effect of the open fire is normally much larger and an average figure of 4½ air changes per hour has been assumed. Combining the design temperature rise of 30°F. and the 4½ air changes per hour the open fire heat requirement for our example room of 22 ft. × 11 ft. × 8 ft. 6 in. amount to 10,300 B.Th.U./hr. One of the easiest methods of improving the performance of an open fire is to restrict the chimney opening as, for example, by introducing a metal gather. An air change of 2½ per hour is easily obtained if the flue area at the restriction is about 20 sq. in. The heat requirement of 10,300 B.Th.U./hr. becomes 8,000 B.Th.U./hr., a reduction of 22%, by decreasing the air change from 4½ to 2½/hr.

For the final step in the calculation of the open fire heat output it is necessary to consider what should be the respective values of the appliance and intermittency factors. We have seen in previous sections that the appliance factor is largely combustion or heat output flexibility. The modern sealed ashpit type of open fire of the 16-in. size and burning coke gives combustion rates varying from 1 to 2½ lb./hr. At the lowest rate of 1 lb./hr. the fire will stay alight for about six hours before re-fuelling is necessary, the average heat output will only be about 4,000 B.Th.U./hr.; the appearance of the fire would be dull, and such rates of combustion would not be used when the room was occupied.

The flexibility can be improved by using a closure plate which can give a combustion rate of 0.5 lb./hr. under banked conditions of firing and in some appliances can act as a boost to give combustion rates of 3½ lb./hr. Such an open fire appliance can give the same flexibility as the openable stove; its useful heat output would, however, only be the same if the ventilation rate was also controlled. An alternative and better method of improving the open fire is to make use of the down-draught principle, and I have recently[21] described an appliance of this type in which the rate of ventilation can be controlled and in which the range of combustion rates, burning open fire coke, is ½ to 3½ lb./hr.

The open fire is essentially an intermittent appliance and even the new continuous burning open fires are generally only kept alight over night during very cold weather. The appliance margin will not require to be as high as that for central heating boilers (25%), as the direct high temperature radiation will give some comfort after as short a period as one hour, although the comfort zone will only be a small area round the fire. A further guide is given by Code of Practice[22], which for gas fires recommends a margin of 20% on a heat requirement based on a design temperature rise of 25°F. This would give a 17% margin on a design temperature rise of 30°F.

From all the above considerations I have assessed the combined appliance and intermittency factors for the open fire appliances at 25% and the heat requirement of our 22 ft. × 11 ft. × 8 ft. 6 in. living room becomes 12,900 B.Th.U./hr. The 16-in. open fire without back boiler will provide only 9,250 B.Th.U./hr., but the convector or the independent open fire will provide 11,500 B.Th.U./hr. Thus even for a well insulated living room the open fire will not give the required comfort conditions when the air temperature falls below 39°F. The convector or independent open fire is better, and its output will almost suffice to provide the design conditions. It is now fairly general practice to recommend a convector or independent open fire for rooms above 1,500 cu.ft. capacity —*i.e.*, about 175 sq.ft. floor area. The convected warm air should be discharged into the living room.

Controlled Ventilation

It will readily be apparent from the above discussion that improvements in open fire appliances are urgently needed. An immediate improvement can most easily be effected by controlling the ventilation rate—an alteration which can be improvised for all fireplaces and which should be incorporated in all new installations. A 16 to 20 sq. in. opening positioned above the gather of the chimney is all that is required to clear the products of combustion of an open fire. The restriction has, of course, to be made removable to allow for chimney cleaning, and the reduction in area should be gradual from the top of the fireplace opening to the point of restriction.

It has already been mentioned that by using the down-draught principle the flexibility of an open fire can be improved considerably and to the extent of permitting the control of the combustion rate from ½ to 3½ lb. of coke per hour. With a fire of this type a reflector above the fuel bed is essential so that the radiation from the fuel bed can be directed into the room.

In one such fire we have tested, removal of the reflector reduced the radiant heat output by 33%.

There can be little doubt of the desirability of directing the radiation into the space from floor to breathing level—*i.e.*, about 5 ft. This should improve comfort conditions and possibly by reducing the temperature gradient give rise to a higher useful efficiency. The shape of the reflector obviously has a big influence on the 'beam' effect, and it may be found desirable to re-design the reflector used in our tests in order to give the radiation a wider spread in a horizontal plane.

Large Back Boiler Appliance

The large back boiler appliance provides an improved performance for two reasons—first, it is easier to transfer heat to water than to air and hence the overall efficiency is 60% as compared with 55% for a convector, and, second, the output of hot water is sufficient to heat some radiator surface thus providing flexibility in the application of the heat output.

1. *High Output.*

Conditions of Test: Flying start, re-fuelling each 1½ hours boiler connected to lagged indirect cylinder 23.5 gal. actual capacity. Hot water above a temperature 140°F. drawn off as necessary.

RESULTS.

Combustion rate	3.3 lb./hr.	
Heat input	42,400 B.Th.U./hr.	
Radiation output	10,370 „	(24.5%)
Hot water output	10,200 „	(24.0%)
Cylinder and pipe loss	1,500 „	
Boiler flow water temperature ...	175-125° F.	
Boiler return water temperature ...	150-100° F.	

2. *Medium Output.*

Conditions of Test: Fire lit and allowed to burn under controlled combustion conditions for 12 hours re-fuelling as required. Boiler connected to lagged indirect cylinder 23.5 gal. actual capacity. 36.3 gal. of hot water drawn off at tap, remaining hot water output used for space heating at radiator.

RESULTS.

Combustion rate	1.83 lb./hr.	
Heat input	23,400 B.Th.U./hr.	
Radiation output	5,280 „	(22.5%)
Radiator output	2,190 „	(9.4%)
Hot water at tap	36.3 gal. at 134° F.	(17.7%)
Average radiator temperature ...	113° F.	
Average room temperature	61° F.	

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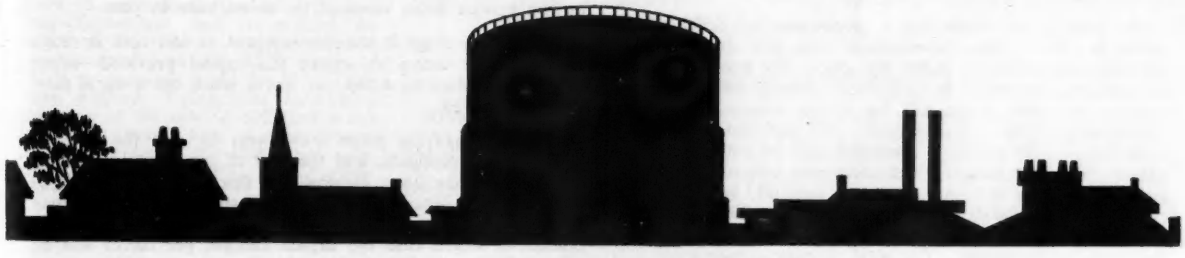

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From the foregoing table of performance the following conclusions may be drawn. The maximum radiation output 10,370 B.Th.U./hr. would not be sufficient to meet the heat requirements of the through living room considered earlier in this paper, which requires 11,680 B.Th.U./hr. For a room of this size, therefore, some of the radiator surface should be installed in the living room. A further radiator should be installed in the kitchen and at least a towel rail in the bathroom giving a connected load of up to 35 sq.ft. combined radiator and connecting piping surface. It must be realised that a large back boiler does not have a sufficient heat output of hot water to heat all this connected load and provide the domestic hot water at the same time, unless the open fire is operated at its maximum rate. The appliance is not intended to be operated in this way, but rather to provide a means of directing the heat output of a single living-room appliance where it can best serve the needs of the household.

To get the best results intelligent usage is required. For example, the living room radiator could be shut off and the kitchen radiator could be on during the forenoon, or all radiators might have to be shut off on wash-day. In the evening the living room radiator would be left on. All radiators should be shut off at night unless the overnight burning plate is used. Many thousands of large back boiler installations have been put in during the last four years, and field test data prove that they give an acceptable service provided the presence of radiators is not taken to mean whole-house heating. Further experiments under more closely controlled conditions are in progress and are expected to provide data on the house heating efficiency of the large back boiler appliance.

Considerable interest is now being taken in the subject of appliance rating, and I have little doubt that before long an agreed procedure will be formulated. The next stage will be to foster and publicise its use in the practical problems of house heating. In this the gas industry through its direct contacts with the local authorities, architects, builders, and the public can play a leading part.

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MANAGEMENT AND PLANNING — Concluded from p. 872

The present Stevenage has a population of 6,500 which, under the New Town Development Plan will increase to an ultimate population of 60,000 by 1980. The present number of domestic dwellings is 1,820, representing 1,816 gas consumers. By 1980, there will be 17,100 domestic dwellings, representing 13,200 gas consumers. We assumed the average consumption per domestic consumer will be 140 therms per annum, and that industry and commerce will ultimately use as much gas as the total domestic demand, based on our experience at Welwyn Garden City and Letchworth Garden City—two towns which have similar characteristics to those proposed for Stevenage. The total ultimate consumption will thus be 740 mill. cu.ft. per annum.

The cost of providing buildings, plant, holders, mains, services, transport, showrooms, and offices is estimated to be £1,530,000, and this is based on prices ruling today, which undoubtedly will be higher when contracts are placed. (Meters and appliances have been excluded on the assumption that rents obtained will meet the capital costs incurred.)

Works expenditure, excluding all holders other than relief holders, amounts to £190,000 per mill. cu.ft. of gas per day. Feeder mains, including industrial and town centre mains, are equivalent to £6 per dwelling, and estate mains £18 per dwelling. This expenditure ranges from £2,500 down to £1,140 per mill. cu.ft. sold. This figure compares with £635 per mill. cu.ft. sold—the position of the former Watford and St. Albans Gas Company at vesting date.

For the purpose of computing the cost of capital servicing, the assets to be provided have been allocated according to the proposed date of purchase throughout the period of development—that is, 1951 to 1980. The gas demand has also been estimated year by year over that same period. The assets have been depreciated at the rates agreed for the industry as a whole, while an interest rate has been allowed, based on the present-day cost of raising capital, of 3½% and computed on the written down value of the assets year by year.

At an early stage in the development, it will cost as much as 7.57d. per therm to service the capital provided—which figure will reduce to 4.24d. per therm when the town is fully built up in 1980.

The accompanying graph shows year by year the expenditure, the gas demands, and the cost of the capital servicing. Although it has been assumed, in this case, that industrial and domestic demands will develop simultaneously, it may be that in a new town industry will, for some time, lag behind, in which case the capital charges per therm will be slightly higher in the earlier years.

In the first accounts of the Eastern Gas Board, it is of interest to note that the cost to date of capital servicing (on a full year's basis) is 1.98d. per therm, and this, incidentally, is one of the highest costs of any area board.

These heavy costs of capital servicing are indicative of an upward trend in gas prices, and unless we can offset them by lowering other component costs, we shall find ourselves in a very unfavourable competitive position with oil—and possibly electricity. The selling price of gas must be the vital concern of each of us, as our survival as an industry depends upon it. Can we lower the capital costs of coal gas plant per gaseous therm produced, and concurrently develop cheaply-constructed heavy oil gasification plants for both base and peak load demands, and, not of least importance, can we sell more gas per domestic consumer?

These are issues which challenge our technicians, sales staff, and management. If the success of our personnel in these fields depends upon that priceless gift of enthusiasm, the future of the industry is assured. Unfortunately, the country appears to be entering a period of severe austerity, when limited labour and material resources will restrict our ambitions. Let us hope that it will be of short duration.

TRADE NEWS

British Vacuum Cleaner

The British Vacuum Cleaner and Engineering Co., Ltd., has published an attractive souvenir booklet which records in pictorial form the story of the vacuum cleaner, of which this Company are the pioneers.

It is 50 years ago that their Chairman, Mr. H. Cecil Booth, F.C.G.I., M.Inst.C.E., constructed and patented a machine which he christened the vacuum cleaner. It is recorded that in the prospectus of the original company formed to exploit the invention, the words 'Vacuum Cleaner' appeared in the English language for the first time.

The story is an absorbing one, not only the early years of the company prior to the 1914-18 war, but through the passage of time to the present day. The pictures shown in the latter pages of the booklet clearly illustrate the tremendous development of the vacuum cleaner throughout the industrial and domestic field. (*British Vacuum Cleaner and Engineering Co. Ltd., Goblin Works, Leatherhead, Surrey.*)

A. Monk & Co.

The above company are the contractors for a gasholder foundation at Stapleton Road, Bristol. The site is on an old brick-works tipping which had to be removed. It was necessary to get down to rock formation to provide a solid foundation and to reduce the height of the holder. Mounted on a concrete reinforced tank 42 ft. deep and 232 ft. in diameter, it will be 160 ft. high when inflated. Excavations have been going on at the rate of 600 tons a day and about 30,000 tons is being stored for refilling round the tank when completed. (*A. Monk & Co., Ltd., Padgate, Warrington.*)

Quasi-Arc

A sound film, 'Arc Welding,' has been produced by the Quasi-Arc Company, Ltd., to give information on the process to the wide number of engineering audiences who come in contact with welding but have no detailed knowledge of it. The film runs for 20 mins. and is 16 mm., utilising Kodachrome colour. With the aid of animated diagrams, it shows the way in which a weld is made and the principles to be followed to ensure that sound welds can always be produced. It also deals with the type of equipment used, how welding operators are trained, the method of manufacturing arc welding electrodes to ensure consistency and reliability, and the testing of finished welds. Copies of the film are available free of charge, and it is particularly suitable for showing to engineering societies, technical colleges, engineering training schools and works' groups. Arrangements can be made for hire of 16 mm. sound projectors and operators if necessary. Further information may be obtained from the *Quasi-Arc Co., Ltd., Bilston, Staffs.*

Eyre Smelting

A calendar (from April, 1951, to March, 1952) has been produced to tie up with the Festival of Britain. It depicts in map form, Eyre's position in relation to the Festival and many places of interest near their works. Applications should be made on business note paper to: *Engineering Sales Dept., The Eyre Smelting Co., Ltd., Tandem Works, Merton Abbey, S.W.19.*

Greenham Equipments

Greenham Equipments, Ltd., announce in their spring plant list that their policy of stocking new plant has been so well received that they are considerably enlarging the range. Particular attention is drawn to the Victor electric hammer drill (Victor Products, Ltd.) for which Greenhams are sales and servicing agents for London and the home counties.

Three-fourths of the plant list deals with new and rebuilt plant, comprising compressors, cranes, crushers, dumpers, hoists, mixers, pumps, and rammers, and the rest of the list describes a selection of used plant for sale. Both new and used plant covers the productions of a large number of makers supplying plant for use in various branches of the gas industry. (*Greenham Equipments, Ltd., Clayton Road, Ruislip Road, Greenford, Middlesex.*)

C. C. Wakefield & Co., Ltd.

'Steel Works Lubrication' is the title of an excellently produced and comprehensive booklet published by this company. Almost every type of lubrication problem is present in the steel industry from slow semi-rotary motions up to the highest speeds, from the 100 tons tilting furnace and the ore crusher to the cold tandem strip mill delivering tinplate gauge strip at 70 miles an hour; from the very low temperatures in exposed positions on ore bridges and blast furnaces to the very high temperatures on hot metal ladles and ingot bogies.

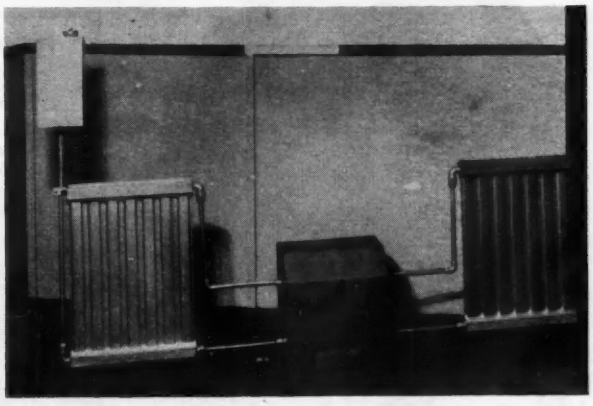
Very similar problems exist on the average gasworks, which should make this booklet a useful addition to the gas engineer's reference library. Recommended Wakefield grades of oils and greases for various purposes are summarised at the end. (*C. C. Wakefield & Co., Ltd., Grosvenor Street, London.*

British Tabulating

Punched card tabulating, recording, and accounting systems have already found their place in the gas industry and have stood the test of many years continuous and efficient service. Among these, the 'Hollerith' system has proved adaptable to public utility undertakings. For this reason a new booklet by the British Tabulating Machine Company under the title 'In Business, too . . .' makes interesting reading both to gas boards which are converted to the advantages of the system and to those which are still hovering on the brink. (*The British Tabulating Machine Co., Ltd., 17, Park Lane, London, W.1.*

Planet Central Heating Units

Among new gas central heating appliances is the Mark 11. H. Planet, and our illustration indicates the principle of the unit, for which compactness and efficiency are claimed. The unit can be fitted in any part of the average dwelling house having a flue, and it is designed for use also in greenhouses. In our illustration two radiators are shown conected to the Planet tubular heater, which has a gas consumption of 30 cu.ft./hr. The heater is fitted with thermostat, flame failure device, and flue. The boiler has an asbestos jacket and the outer casing is detachable for cleaning. The makers state that the boiler is capable of heating, on a level run, five radiators of 6.5 sq. ft. surface each, using ½ in. B.S.S. copper tube. The unit can be adapted for use with butane gas, which makes it applicable to the heating of caravans, boats, and buildings isolated from a supply of town gas.—*Planet Central Heating Units, 6, Devonshire Street, Manchester, 15.*



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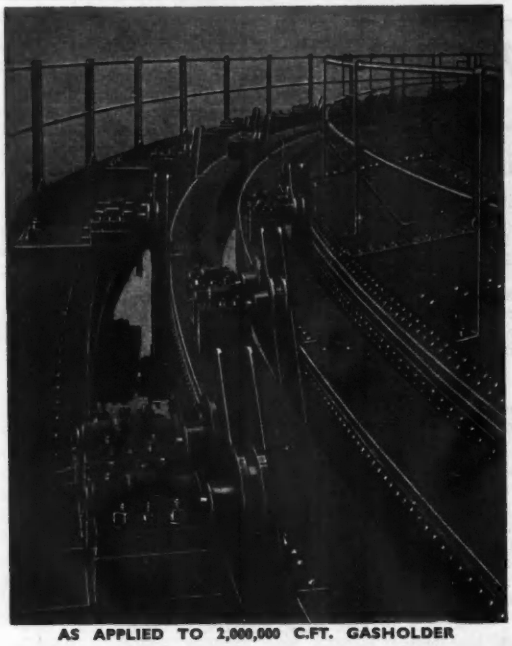

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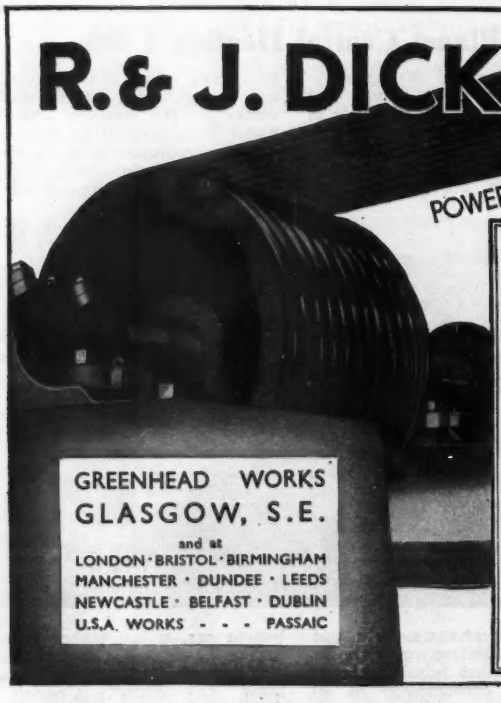

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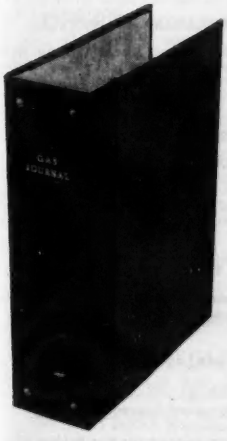

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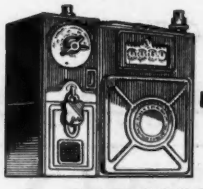

A MODERN MEASURE for the Gas Industry

ALDER & MACKAY LTD.
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EDUCATIONAL

THE UNIVERSITY OF LEEDS
GAS RESEARCH FELLOWSHIP.

A FELLOWSHIP, of the value of £325 a year provided by the Institution of Gas Engineers, will be awarded by the Senate to a duly qualified candidate for the prosecution of post-graduate research in gas chemistry. Preference will be given to candidates who have signified their intention of entering the coal gas industry, or in default of any such candidate, to a person qualifying for some other branch of the fuel industry.

Applications should reach the Registrar, The University, Leeds, 2 (from whom further particulars may be obtained), not later than July 31, 1951.

"KLEENOFF"

THE COOKER CLEANER

Tins for Sale to Consumers. In Bulk for Works Use

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BALE & CHURCH, LTD.

7, CROMPTON WAY, MANOR ROYAL, CRAWLEY, SUSSEX.

Telephone CRAWLEY 1212-3. Telegrams: "Balefire, Crawley."

PLANT FOR SALE

FOR SALE. 13-ton all round slewing crawler mounted EXCAVATOR with 50-ft. lattice jib, petrol engine. Condition as new. Enquiries to Abelson & Co. (Engineers) Ltd., Coventry Road, Sheldon, Birmingham. *Telephone*: Sheldon 2424.

FACTORY FOR SALE

PRELIMINARY NOTICE

FOR SALE by Private Treaty or by Auction on a date to be announced. On the instructions of Foster Brothers Ltd., who are removing to larger premises.

MODERN FREEHOLD FACTORY/WAREHOUSE
No. 63, Webber Street, Blackfriars, S.E.1.

TWO FLOORS about 5,720 sq. ft., with Office and Lavatory accommodation. Hoist, Central Heating and Yard about 570 sq. ft. Erected 1938 and designed for the exceptionally heavy floor loading involved in the storage of Steel Tubes & Fittings. Full particulars from:—

FIELD & SONS
54, Borough High Street, S.E.1. HOP 1375/6

CONTRACTS OPEN

WALES GAS BOARD

NEATH UNDERTAKING.
HIGH PRESSURE MAINS.

TENDERS are invited for the laying of approximately 1,250 yards of 12 in. diameter CAST IRON MAIN and 3,500 yards of 10 in. diameter WELDED STEEL MAIN, from Neath Gas Works, to Aberdulais. Contractors tendering must have had experience in the laying of cast iron and steel mains for high pressure gas.

Specification, Drawings and Form of Tender can be obtained upon application to the undersigned to whom completed Tender Forms must be received not later than June 30, 1951.

G. FITTON,
Engineer and Manager.

Gas Works,
Millands,
Neath.

PUBLISHERS' NOTICE

The "Gas Journal" is published every Wednesday, price 1/-; by post 1/2d.

Subscription Rates: Home and Empire :- 52/- per annum; Foreign :- 60/- per annum. (Both payable in advance.) A copy of the "Gas Journal" Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 1/9 per line (approx. 7 words) - minimum charge 10/6. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10" deep x 7" wide; block screen 120.

BUSINESS MANAGER: S. T. CULLEN

MIDLANDS OFFICE: 10, Union Street, Birmingham.

NORTHERN MANAGER: W. Q. Foster, 33, St. Helens Road, Harrogate. 'Phone: Harrogate 84291.

WALTER KING, LTD., 11, Bolt Court, Fleet Street, London, E.C.4.

Telephone: CENtral 2236-7. Telegrams: Gasking, Fleet, London.

APPOINTMENTS VACANT

CARBONISING FOREMAN required for British Owned Gas Company in Brazil to take charge under Works Superintendent of Gibbons Horizontal Retort House with Charging Machinery. Experience of Resetting Gibbons Retorts. Married or Single man aged about 35. Superannuation scheme. Unfurnished House available with Free Gas, Water and Electric Light. Three year agreement subject to renewal with passage paid both ways. Salary in line with present day living costs. Application giving education training and experience will be treated in strict confidence. Write Box G.J.107, at 191, Gresham House, E.C.2.

SOUTH WESTERN GAS BOARD

CHELTENHAM SUB-DIVISION.
CHIEF DRAUGHTSMAN.

APPLICATIONS are invited for the position of CHIEF DRAUGHTSMAN for the Sub-Division.

Applicants should have received Gas Works and/or Gas or Constructional Engineering Contractors training and with experience in Building Construction.

The successful applicant would be responsible to the Sub-Divisional Production Engineer for the preparation of plans and specifications in connection with new Works development in the Sub-Division and must be capable of supervising site work.

The successful applicant may be requested to pass a medical examination.

The salary will be within Grade XII Provincial A, £695-£820 of the salary scale of the National Joint Council for Gas Staffs.

Applications stating age, qualifications, present position, training and experience, together with the names of two referees should be addressed to the undersigned within twenty-one days of the publication of this advertisement.

A. L. MORRIS,
Manager,
Cheltenham Sub-Division.

South Western Gas Board,
North Street,
Cheltenham, Glos.

SOUTH WESTERN GAS BOARD

CHELTENHAM SUB-DIVISION.
STROUD UNIT.
VACANCY FOR CARBONIZING FOREMAN.

APPLICATIONS are invited for the position of CARBONIZING FOREMAN at the Gas Works of the Stroud Unit, Canal Side, Stroud, Glos.

The person appointed must be experienced in the control of retort house labour, fully conversant with Horizontal Retort House practice, and a strict disciplinarian.

The successful candidate will be responsible to the Station Engineer for the control and efficient working of the Horizontal Carbonizing plant.

The carbonizing plant at Stroud consists of nine beds of eight through retorts, with Drakes charging and discharging machine with producer gas dilution plant.

The salary offered will be within the grade VI B (£400-£445) of the Intermediate Grades of the National Joint Standing Committee.

A house is available at a reasonable rent.

Applications addressed to the undersigned should be received not later than fourteen days after the appearance of this advertisement.

A. L. MORRIS,
Sub-Divisional Manager.

Cheltenham Sub-Division,
North Street,
Cheltenham, Glos.

A DRAUGHTSMAN aged 25 to 30 is required for the Clarence By-Product and Distillation Plant of Messrs. Dorman Long & Co. Limited. Applicant should be good, all-round man, preferably with experience of the above type of plant. Permanent employment with good prospects to competent man with initiative. Pension scheme in operation. Apply stating age, salary required, when at liberty, and giving full particulars of technical education and experience to: Chief Technical Engineer, Dorman Long & Co. Limited, Central Engineering Department, Royal Exchange, Middlesbrough.

NORTH THAMES GAS BOARD

A PIPE DRAUGHTSMAN is required for the Distribution Department drawing office at Imperial Road, Fulham, S.W.6. Candidates should have had experience in the design and layout of large mains. Starting salary range, £485 per annum to £610 per annum, depending upon age, qualifications and experience.

The appointment is of a permanent nature, and pension arrangements will be discussed with short list candidates.

Applications, giving age and full particulars, should be sent to the Staff Controller, North Thames Gas Board, 30, Kensington Church Street, London, W.8, quoting reference number 10008.

NORTH THAMES GAS BOARD

A SENIOR DRAUGHTSMAN is required in the Chief Engineer's Department at Westminster.

Applications are invited from candidates, not less than thirty years of age, who are experienced in the design, layout and detailing of mechanical handling plant. The starting salary would be in the region of £650 per annum.

The appointment is of a permanent nature, and pension arrangements will be discussed with short list candidates.

Applications, stating age and full particulars of training and experience, should be sent to the Staff Controller, North Thames Gas Board, 30, Kensington Church Street, London, W.8, quoting reference number 10,000.

EASTERN GAS BOARD

WATFORD GROUP.
ASSISTANT DISTRIBUTION ENGINEER.

APPLICATIONS are invited for the position of ASSISTANT DISTRIBUTION ENGINEER to the Watford Group of the Eastern Gas Board.

The successful applicant will be responsible to the Group Distribution Engineer, and should have good practical experience in all branches of distribution work and be capable of assisting the Engineer in the planning of development schemes.

Applicants should possess the Higher Grade Certificate of the Institution of Gas Engineers in Gas Engineering—Supply, or its equivalent, and should preferably be not more than 35 years of age.

The post is graded in Grade A.P.T. VIII £560-£640, and the commencing salary will be in accordance with capabilities and experience of the applicant.

The successful candidate will be required to pass a Medical Examination and the appointment will be subject to the provisions of any Superannuation Scheme which may be adopted by the Board.

Applications, endorsed Assistant Distribution Engineer, should be submitted in writing stating age, education, qualifications and experience together with names of two persons to whom references may be made and be submitted to the undersigned not later than July 7, 1951.

T. C. BATTERSBY,
Divisional General Manager.

Radiant House,
Clarendon Road,
Watford, Herts.

CHIEF GAS ENGINEERS wanted for Gas Works in Bombay and Calcutta. Age 35-45. Salary and allowances according to qualifications but not less than the equivalent of £2,000 per annum, plus Provident Fund. Residential accommodation available. Appointment, in first instance, for three to five years. Passages paid. Candidates must be fully qualified Gas Engineers and capable administrators. Applications, stating full particulars of qualifications, experience, present position, age and whether married or single to be sent, as soon as possible, to:—The London Agents, Bombay and Oriental Gas Companies, Broad Street House, 54, Old Broad Street, London, E.C.2.

NORTH EASTERN GAS BOARD

APPLICATIONS are invited from suitably qualified persons for the following posts in the Industrial Relations Department of the Board's Headquarters:—

1. EDUCATION ASSISTANT
   The duties of the post will include arrangements for the introduction of education and training schemes and will involve contacts with local Education Authorities concerning the provision of suitable courses. Preference will be given to applicants with experience in this direction. The salary will be in accordance with Grade A.P.T. VIII of the National Salary Scales (£540-£620 per annum).
2. INDUSTRIAL RELATIONS CLERK
   The person appointed will be required to assist the Industrial Relations Officer in all matters connected with the joint negotiating machinery of the Gas Industry. Ability to take shorthand notes of meetings will be an advantage. The salary will be in accordance with Grade A.P.T. VII of the National Salary Scales (£500-£580 per annum).

The successful applicants may be required to pass a medical examination and to subscribe to such superannuation scheme as the Board may adopt.

Applications, giving details of present position, training and experience, together with the names of two referees, should be addressed to the undersigned to arrive within fourteen days of the publication of this advertisement.

J. C. GARDNER,
Secretary.

Bridge Street,
Leeds, 2.

NORTH WESTERN GAS BOARD

OLDHAM-ROCHDALE GROUP.
OLDHAM UNDERTAKING.
SENIOR SHOWROOM ASSISTANT.

APPLICATIONS are invited for the position of SENIOR SHOWROOM ASSISTANT at the Gas Showrooms, Market Place, Oldham.

Candidates should have had experience and training in the control of showroom and staff and in sales and service as applied to the Gas Industry.

The salary for the position will be in accordance with Grade A.P.T. V (£425-£505 per annum) of the National Salary Scales for the Gas Industry the commencing salary being decided after reference to the experience and qualifications of the successful applicant.

The successful applicant may be required to pass a medical examination and to subscribe to such scheme of superannuation as the Board may adopt.

Applications stating age, qualifications and experience, with details of the present position occupied should be forwarded together with the names and addresses of two referees, to The General Manager, North Western Gas Board, Oldham-Rochdale Group, Gas Offices, Dane Street, Rochdale, to arrive not later than twelve days after publication of this advertisement.

June 7, 1951.

(*Classified advertisements continued on Supplement 4*)

APPOINTMENTS VACANT (ctd.)

NORTH WESTERN GAS BOARD

SOUTH LANCASHIRE GROUP.

GROUP COKE SALES REPRESENTATIVE.

APPLICATIONS are invited for the above position at a salary of £850 per annum.

Under the direction of the General Manager, the person appointed will be required to develop and regulate the sale of coke produced at the various Gas Works within the Group. Applicants should have had experience of the coal and coke trade and be knowledgeable on the use of coke and coke burning appliances.

The successful applicant may be required to pass a medical examination and to subscribe to such scheme of superannuation as the Board may adopt.

Applications, appropriately endorsed, giving personal details and particulars of training, qualifications and experience, together with the names and addresses of two referees should reach the General Manager, North Western Gas Board (South Lancashire Group), Radiant House, St. Helens within fourteen days of the publication of this advertisement.

NORTH WESTERN GAS BOARD

MANCHESTER GROUP.

SHIFT ENGINEER— ROCHDALE ROAD WORKS, MANCHESTER.

APPLICATIONS are invited for the position of SHIFT ENGINEER at the Rochdale Road Works. The appointment will be subject to the conditions of service as agreed by the National Joint Council for Gas Staffs from time to time, and the salary range will be within A.P.T. Grade VII (£500-£580 per annum).

Applicants should have practical experience in the operation and maintenance of a continuous Vertical Retort Installation of approximately 6,000,000 cu. ft. per diem, and be capable of supervising general Gas Works plant operation.

The successful applicant may be required to pass a medical examination and to subscribe to such scheme of superannuation as the Board may adopt.

Applications, appropriately endorsed, giving personal details and particulars of training, qualifications and experience, together with the names and addresses of two referees, should reach the General Manager, North Western Gas Board (Manchester Group), Town Hall, Manchester, 2, within twelve days of the publication of this advertisement.

NORTH WESTERN GAS BOARD

OLDHAM-ROCHDALE GROUP.

ASSISTANT STATION ENGINEER— DANE STREET, GAS WORKS, ROCHDALE.

APPLICATIONS are invited for the position of ASSISTANT STATION ENGINEER at the Dane Street Gas Works, Rochdale.

Applicants for this position should preferably hold a Higher Grade Certificate of the Institution of Gas Engineers, or its equivalent, and should have had experience in the control and operation of vertical retorts, carburetted water gas plants and Gas Works ancillary plant.

The salary for the position will be within Grade A.P.T. IX (£570-£670 per annum) of the National Salary Scales.

The successful applicant may be required to pass a medical examination and to subscribe to such scheme of superannuation as the Board may adopt.

Applications endorsed "Assistant Station Engineer" giving personal details, particulars of training, etc., should be forwarded, together with the names and addresses of two referees, to the General Manager, North Western Gas Board, (Oldham-Rochdale Group) Gas Offices, Dane Street, Rochdale, to arrive within twelve days of the publication of this advertisement.

WALES GAS BOARD

GROUP TECHNICAL ASSISTANTS.

APPLICATIONS are invited for TECHNICAL ASSISTANTS to serve the Pembrokeshire and Carmarthenshire Groups of Undertakings of the Wales Gas Board. Preference will be given to candidates who have had all-round experience in carbonisation and water gas manufacture and who hold the ordinary Grade Certificate of the Institution of Gas Engineers in Gas Engineering (Manufacture).

Applicants should be qualified by training and experience to undertake the technical supervision of gas manufacturing processes in a Group of Undertakings. Ability to drive a car is a desirable qualification.

The salary will be in accordance with Grade V of the Board's Scale of Salaries (£410-£490). Successful candidates will be required to pass a medical examination and will be subject to the provision of any superannuation scheme which the Board may introduce.

Applications, stating age, training, qualifications and experience should be posted to reach Mr. Clark Jackson, Pembrokeshire Group Chairman, Wales Gas Board, 150, Windsor Road, Neath, Glam., not later than July 10, 1951.

C. B. MAWER,
Secretary.

1/2, Windsor Place,
Cardiff.

WEST MIDLANDS GAS BOARD

WALSALL AND DISTRICT DIVISION.
ASSISTANT TO DIVISIONAL ENGINEER.

APPLICATIONS are invited from suitably qualified persons for the above position.

Candidates must have had experience in the construction and maintenance of Gasworks Plant in general, and the preparation of major schemes in all their aspects for extensions to Works and Plant.

The salary for the post will be not less than £950 per annum on commencement rising by annual increments of £50 to a maximum of £1,050 per annum.

The appointment will be subject to such superannuation regulations as the Board may, in due course, adopt, and the successful candidate may be required to pass a medical examination.

Applications stating age, qualifications and experience, together with the names of two referees, should be addressed to the Personnel and Establishment Officer, West Midlands Gas Board, 6, Augustus Road, Edgbaston, Birmingham 15, to reach him not later than fourteen days after the appearance of this advertisement. Applicants are requested to quote ref. T.P.3, when replying to this advertisement.

F. H. CURETON,
Secretary.

WEST MIDLANDS GAS BOARD

WALSALL AND DISTRICT DIVISION.

A DRAUGHTSMAN is required for duties in connection with the Smethwick, West Bromwich and Oldbury Districts.

Applicants should have a knowledge of the distribution of gas and experience of general Drawing Office work.

The salary will be not less than £425 per annum on commencement, rising by annual increments to a maximum of £505 per annum, in accordance with Grade V of the salary scales of the National Joint Council for Gas Staffs.

The successful candidate will be subject to such superannuation regulations as the Board may, in due course, adopt, and may be required to pass a medical examination.

Applications, stating age, qualifications and experience and giving the names of two referees, should be addressed to Mr. E. Hardiker, Divisional Manager, West Midlands Gas Board, Walsall and District Division, Walsall Factory Estate, Tame Bridge, West Bromwich Road, Walsall, to reach him not later than fourteen days after the appearance of this advertisement. Applicants are requested to quote ref. T.P.3, when replying to this advertisement.

F. H. CURETON,
Secretary.

WEST MIDLANDS GAS BOARD

WALSALL AND DISTRICT DIVISION.
ASSISTANT WORKS CHEMIST— SMETHWICK DISTRICT.

APPLICATIONS are invited from suitably qualified persons for the above position.

Applicants should have a sound knowledge of the control of gas manufacture and be experienced in carrying out all the usual Gas Works tests.

The salary for the post will be not less than £455 per annum on commencement rising by annual increments to a maximum of £535 per annum, in accordance with Grade VI of the salary scales of the National Joint Council for Gas Staffs.

The successful applicant may be required to pass a medical examination and to subscribe to such scheme of superannuation as the Board may adopt in the future. Any existing superannuation rights in the Gas Industry would be maintained.

Applications, stating age, qualifications, training and experience, should be addressed to Mr. E. Hardiker, Divisional Manager, West Midlands Gas Board, Walsall and District Division, Walsall Factory Estate, Tame Bridge, West Bromwich Road, Walsall, to reach him not later than fourteen days after the appearance of this advertisement. Applicants are requested to quote ref. T.P.3, when replying to this advertisement.

F. H. CURETON,
Secretary.

WEST MIDLANDS GAS BOARD

WOLVERHAMPTON & DISTRICT DIVISION.
CHIEF CLERK—STOURBRIDGE DISTRICT.

APPLICATIONS for the above post are invited from suitably qualified persons. The duties include responsibility for the general accountancy work for the District and control of clerical staff.

The salary for the post will be not less than £570 per annum on commencement, rising by annual increments to a maximum of £670 per annum, in accordance with Grade IX of the salary scales of the National Joint Council for Gas Staffs.

The appointment will be subject to such superannuation regulations as the Board may, in due course, adopt, and any existing superannuation rights in the gas industry would be preserved. The successful candidate may be required to pass a medical examination.

Applications should be addressed to Mr. F. C. Briggs, Divisional Manager, West Midlands Gas Board, Wolverhampton and District Division, Kensington House, Bath Street, Dudley, Worcs., to reach him not later than fourteen days after the appearance of this advertisement. Applicants are requested to quote ref. T.P.3, when replying to this advertisement.

F. H. CURETON,
Secretary.

WEST MIDLANDS GAS BOARD

WARWICKSHIRE DIVISION,
COVENTRY DISTRICT.
GAS FITTERS.

WANTED—FIRST- and SECOND-CLASS GAS FITTERS with City and Guilds qualifications; Provincial Grade A rates of pay, plus cost of living bonus. Applications to be addressed to the undersigned, stating age, experience.

A. E. WEST, A.M.I.G.E.,
Engineer and Manager.

Coventry District,
White Cottage,
970, Foleshill Road,
Coventry.

WEST MIDLANDS GAS BOARD

WALSALL AND DISTRICT DIVISION.

DRAUGHTSMAN—WALSALL DISTRICT.

APPLICATIONS are invited from suitably qualified persons for the position as DRAUGHTSMAN at the Pleck Works, Walsall District.

The salary for the post will be not less than £425 per annum on commencement, rising by annual increments to a maximum of £505 per annum, in accordance with Grade V of the salary scales of the National Joint Council for Gas Staffs.

Applicants should possess a sound knowledge of structural and general engineering work.

The successful applicant may be required to pass a medical examination and to subscribe to such scheme of superannuation as the Board may, in due course, adopt. Any existing superannuation rights in the Gas Industry would be maintained.

Applications giving personal details, particulars of training, qualifications and experience, and the names of two referees, should be addressed to Mr. E. Hardiker, Divisional Manager, West Midlands Gas Board, Walsall and District Division, Walsall Factory Estate, Tame Bridge, West Bromwich Road, Walsall, to reach him not later than fourteen days after the appearance of this advertisement. Applicants are requested to quote ref. T.P.3, when replying to this advertisement.

F. H. CURETON,
Secretary.

WEST MIDLANDS GAS BOARD

WORCESTERSHIRE-HEREFORDSHIRE DIVISION.

TECHNICAL ASSISTANT.

BROMSGROVE WORKS.

APPLICATIONS are invited from suitably qualified persons for the above position.

Candidates should be capable of carrying out all routine Gas Works tests and preferably have had experience in the operation of Machine Charged Horizontal Retorts.

The salary for the post will be not less than £425 per annum, on commencement rising by annual increments to a maximum of £505 per annum in accordance with Grade V of the Salary Scales of the National Joint Council for Gas Staffs.

The successful candidate may be required to pass a medical examination and the appointment will be subject to such Superannuation Regulations as the Board may, in due course, adopt.

Applications stating age, qualifications and experience and accompanied by the names of two referees, should be addressed to Mr. C. F. W. Rendle, Divisional Manager, West Midlands Gas Board, Worcestershire-Herefordshire Division, 12, St. Nicholas Street, Worcester, to reach him not later than fourteen days after the appearance of this advertisement. Applicants are requested to quote ref. T.P.3, when replying to this advertisement.

F. H. CURETON,
Secretary.

EAST MIDLANDS GAS BOARD

LINCOLNSHIRE DIVISION.

DIVISIONAL DRAUGHTSMAN.

APPLICATIONS are invited from draughtsmen holding the Higher National Certificate, or equivalent qualification, for the post of DRAUGHTSMAN in the Drawing Office of the Lincolnshire Divisional Headquarters. The duties will include the preparation of drawings and specifications for plant required in the production and distribution of gas within the Division.

The salary will be in accordance with Grades A.P.T. VI and VII of the National Salary Scales for Gas Staffs (£455-£580) at a commencing step commensurate with qualifications and experience.

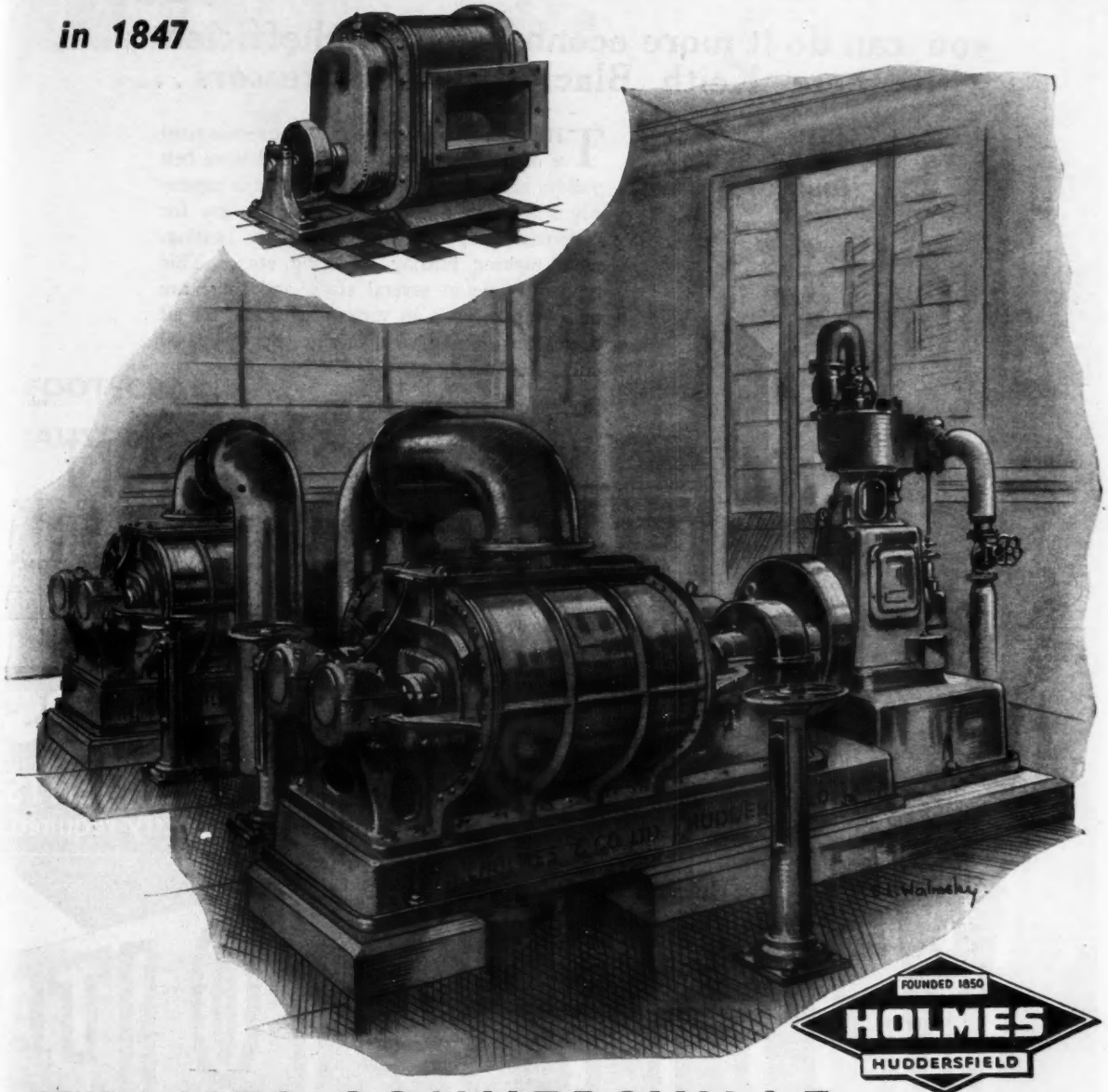
The successful applicant may be required to pass a medical examination, and the appointment will be subject to the provisions of such superannuation scheme which may be adopted by the Board.

Applications stating age and giving full details of education, training and experience, together with the names of two referees should be addressed to the undersigned to arrive not later than July 4, 1951.

B. CLARKE,
Divisional General Manager.

East Midlands Gas Board,
Belle Vue House,
Carline Road,
Lincoln.
June 15, 1951.

Exhauster built by George Jones in 1847



FOUNDED 1850
HOLMES
HUDDERSFIELD

HOLMES-CONNERSVILLE

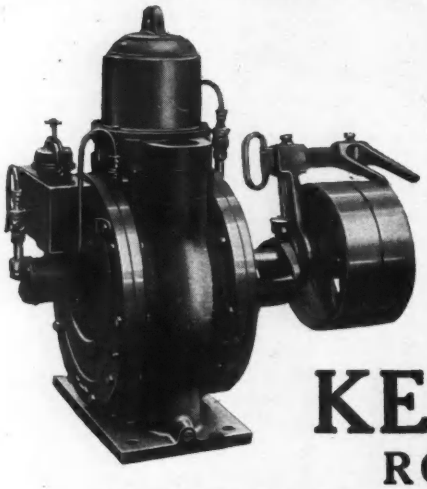
The Exhauster of 1951

W. C. HOLMES & CO. LTD. · HUDDERSFIELD · LONDON · BIRMINGHAM

Telephones: Huddersfield 5280 London: VICtoria 9971 Birmingham: Midland 6830 C 355

When pressure of Gas or Air has to be increased up to 5 lbs. p.s.i..

you can do it more economically and efficiently with these Keith Blackman Compressors....



THE machine illustrated in this advertisement is our Type 4, fitted with fast and loose belt pulleys and striking gear. This type is especially suitable for compressing air or gas for industrial purposes, such as furnace heating, metal melting, brazing, soldering, etc. . . This type is made in several sizes, and there are many other types, in various sizes and for all drives, for dealing with volumes up to 20,000 cubic feet per hour.

Ask for a copy of our Cat. 10/7.

KEITH BLACKMAN
ROTARY COMPRESSORS

KEITH BLACKMAN LTD., MILL MEAD RD., LONDON, N.17. TN: TOTTENHAM 4522. TA: "KEITHBLAC NORPHONE LONDON."
And at Manchester Birmingham Leeds Newcastle-on-Tyne Glasgow Belfast and Penarth nr. Cardiff.

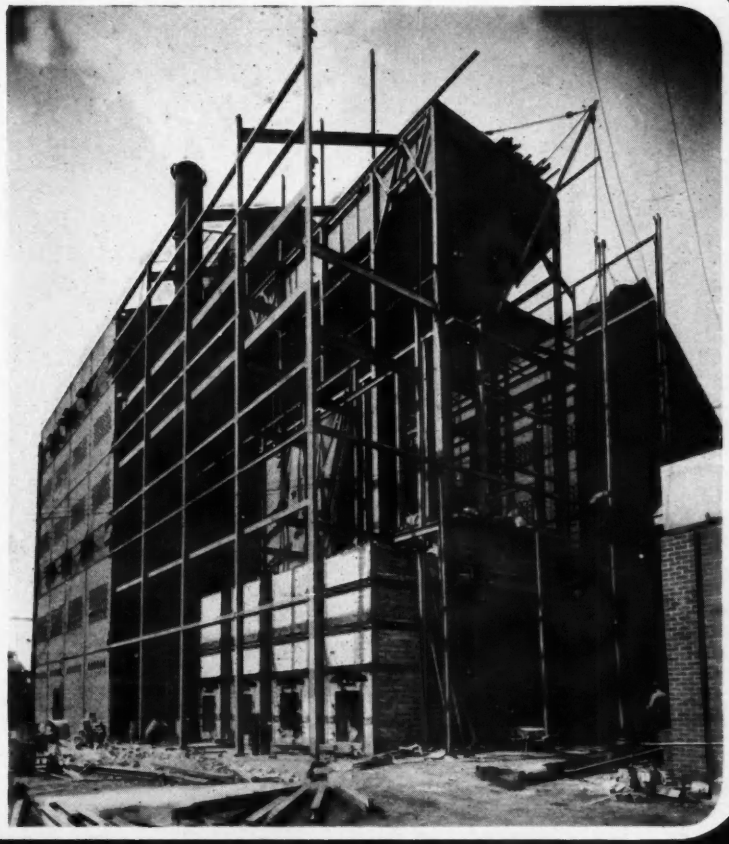
WILLEY & CO. LTD

GAS METERS
for
INDUSTRIAL ESTABLISHMENTS
made to any capacity required.

EXETER

Printed by STRAKER BROTHERS LTD., E.C.2, for WALTER KING, LIMITED, 11, BOLT COURT, FLEET STREET, LONDON, E.C.4. Wednesday, June 20, 1951.

Work in progress



FOOTSCRAY, AUSTRALIA

Since the original carbonizing plant at Footscray consisting of 24 retorts was installed in 1926, several additions have been made. The latest extension, shown here, comprises 16 retorts, bringing the total number of retorts to 80.

West's Gas IMPROVEMENT CO., LTD.

MILES PLATTING, MANCHESTER, 10

Telephone: COLlyhurst 2961-5. Telegrams: Stoker, Manchester.

London Office: COLUMBIA HOUSE, ALDWYCH, W.C.2. Telephone: HOLborn 4108-9. Telegrams: Wesgasco, Estrand.

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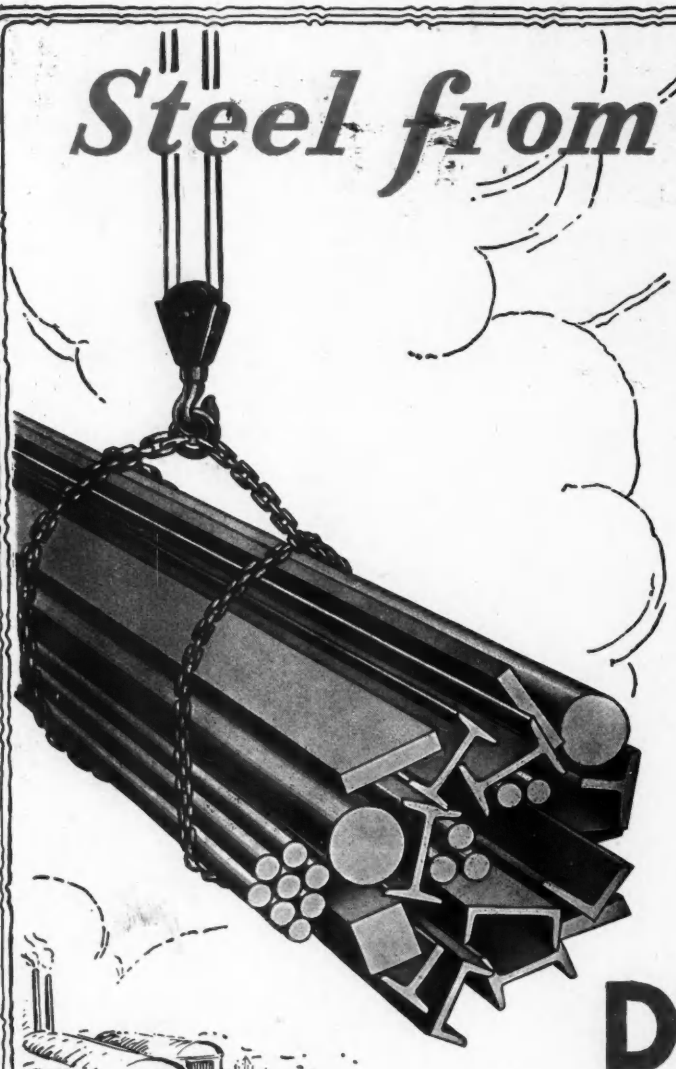

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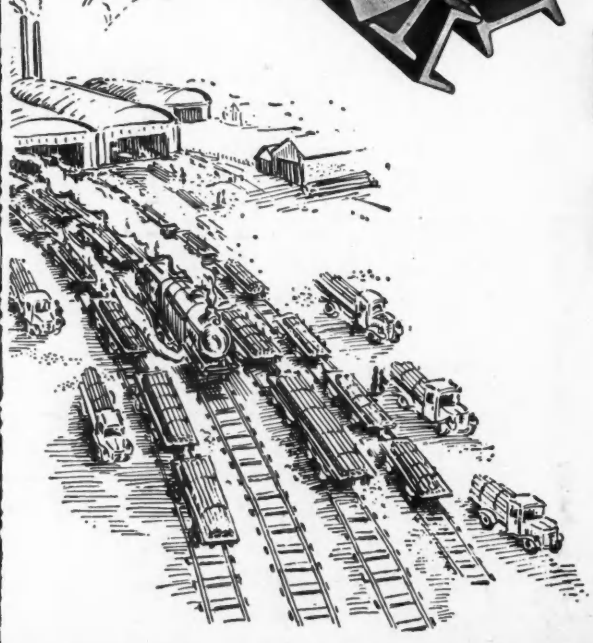

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